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III. *Employment of Natives, and the Civil Service.*—We are doing much, and we are proposing to do more, to extend gradually the employment of Natives in offices of higher trust and responsibility, and to reduce the number of the European Civil staff. We do not approve the proposal to abolish the Covenanted Civil Service and recruit the Civil administration entirely from the Army.

IV. *Legal and Judicial System.*—We do not admit that we have imported English laws and English ideas of property into India, to the effacement of Indian ideas and customs. We maintain that, for many years, successive Indian Governments have been most careful to respect Native ideas, customs, and even prejudices, in such matters, and that any deviation from such a procedure would be dangerous. We are conscious that our judicial system is susceptible of improvement. But we maintain that it is popular with the intelligent and propertied classes, and that the bulk of the population would deprecate any change from the reign of law to a regimen of personal discretion or patriarchal rule.

V. *Over-population.*—We admit that the density and the increase of the population in certain parts of India constitute a distinct political and social difficulty. But we do not see how any practicable change in the land laws can mitigate this difficulty. We look to the improvement of railway and other communications, to the spread of education, to increased emigration from the densely to the sparsely peopled districts, and to the extension of manufacturing industry, for the gradual amelioration of the evils caused by over-population.

VI. *Land Tenures.*—We deny that the action of the British Government has, save in the course of the ordinary march of affairs, effaced the communal and village system of India. We believe that the theory and the practice of separate property in land must gain ground, and we deem it unwise to legislate generally for the arrest of this process. We do not advocate any general redemption of the land tax, and we believe that any such general redemption is impossible. We are satisfied that a general return to corn rents, or to the ment of the land revenue in kind, would be most undesirable and most ular. We have done much, and hope to do more, to restrict the nt to the people, and the expense, inseparable from periodical the land revenue conducted under the old system.

We much doubt whether the soil of India is generally deteriora- ppreciable extent, and we wholly deny that the land revenue is We adduce figures to show the enormous increase in the value di xports, consisting chiefly of raw-produce and largely of new of Ve admit that there is much room for improvement of Indian agri- systems and processes. We are taking steps to promote such ment, the results of which can appear but slowly and gradually. We utely opposed to imposing a special acreage tax on certain irrigated such a tax would be contrary to our land revenue system, and would e cultivation of valuable staples. We fully admit the desirability of he rice trade from export duties; but at present we do not see our rrendering the income (505,000*l.*) which those duties yield.

y abstained from burdening the present Despatch with detailed discussions and reports on the subjects of which it treats. But if e fit to call for further information or opinion, or to convey an views, on any of the questions raised, we shall be glad to

We have the honour to be,
My Lord Marquis,
Your Lordship's most obedient humble Servants,

(Signed) LYTTON.
F. P. HAINES.
J. STRACHEY.
E. B. JOHNSON.
RIVERS THOMPSON.
J. GIBBS.
A. FRASER.

Cassencary, Crèetown, N.B.,
28th August 1880.

My Lord Marquis,

Having perused the Despatch of the Government of India of 8th June last (received by me a few days ago) on the subject of my report to your Lordship's predecessor on the condition of India, I request permission to offer some observations thereon, premising that I am painfully aware of my inadequate treatment of so vast and complicated a subject, and very grateful to the Government of India for the considerate spirit in which they have been pleased to criticise my suggestions.

The Despatch deals with my report under seven separate heads, and approves or agrees with some part of my recommendations in each.

1. *Administration.*—They approve of the extension of the principle of local control and provincial responsibility.

2. *Public Works.*—They agree to the expediency of transferring to local governments full control and responsibility for all local public works; they desire to extend the employment of Native engineers; they would encourage the application of British capital to Indian works; they do what is possible to develope coal fields in India; and they agree that break of gauge on main trunk lines of railway should be avoided.

3. *Employment of Natives.*—They are now doing, and will do more, to extend the employment of Natives.

4. *Legal and Judicial System.*—They are conscious that the judicial system is susceptible of improvement.

5. *Over-population.*—They admit that the density and increase of the populatio[illegible] certain parts of India constitute a distinct political and social difficulty, and reco[illegible] the necessity of meeting this difficulty.

6. *Land Tenures.*—They admit the expense to the State, and the harass[illegible] the people, of the periodical revisions of land revenue, and hope to restrict this[illegible]

7. *Agriculture.*—They admit that there is much room for improvement [illegible] agricultural systems and processes, and that towards this object, in re[illegible] valuable product, it is very desirable to free the rice trade from export d[illegible]

Having thus obtained the sanction of the experience and knowled[illegible] ment of India to so many suggestions of leading importance, I [illegible] would be either necessary or becoming in me further to [illegible] administration. I believe the time is approaching when [illegible] of decentralization and local responsibility advocated in [illegible] necessary alike for the credit and security of British authorit[illegible] prosperity of her people. Under the present system the wh[illegible] revenues are swept into the Imperial Treasury, and doled out a[illegible] views of the body of distinguished men who constitute the Gove[illegible] are far from, and necessarily unacquainted with, local peculiarit[illegible] They live at as great a distance from most of the provinces a[illegible] this country, the regulation of its railways and public works, [illegible] finances, were directed by a committee of eminent foreigners [illegible] Madrid. Their idea of financial responsibility would appear to be [illegible] should pay into their Central Exchequer all revenues derived fr[illegible] and customs, and be content, for the wants of the provinces, w[illegible] authorities at Simla can spare, raising by local taxation whateve[illegible] Surely it would be better that each province should manage i[illegible] contributing its proper share to Imperial necessities, expend t[illegible] in developing its own resources.

On the three questions of over-population, land ten[illegible] however, desire to offer some explanatory observati[illegible] relations between the cultivator and his creditors, a[illegible] may be most conveniently dealt with together, and on th[illegible] adequate treatment hinges, in my opinion, the future success[illegible] Government in India.

There does not appear to be as yet any reliable data for forming a co[illegible] of the rate of increase of population. The result of the four censuses taken [illegible] as mentioned (para. 15) of the Despatch, would fully justify the rate assumed by [illegible] taking it at between five and six tenths per cent. annually, as deemed more p[illegible] by the Government of India, in 20 years there would be 25 millions more pe[illegible] be fed. This, in the same proportion as the cultivated land is to the present p[illegible]

tion, would demand an increase of one eighth to the cultivated area. In 20 years more the increase required would have become one fourth. This assumes that so large a proportion of the surface of a country, very fully peopled, and for long ages cultivated, would be found of equal quality with that earlier taken up,—which is contrary to common sense and experience. Not only, however, would such a reliance prove fallacious, but I fear that the exhaustive agriculture practised on what is termed "dry-cultivation," is gradually diminishing the productive powers of the naturally good land. The Government of India desire definite proof of this by "a continuous "series of recorded experiments on the same ground, and under identical conditions." This is not to be had in India, but the experience of Mr. Lawes in England, under these conditions, on a plot of land unmanured for 40 years, shows a gradual but progressive decline, in the yield of periods of seven years, beginning with 17 bushels of wheat as the average yield of the first period, 15 of the second, 14 of the third, 12 of the fourth, and 9 of the last. How far this may be applicable to the soil of India, it is impossible to say. To a large extent, I fear, it must be, but no doubt the downward progress is arrested by the cultivators by the application of some manure, or occasional rest in fallow. And yet when we consider the condition of the greater number, and their capacity for bettering the land, it becomes impossible to shut our eyes to the danger into which such an increase of a poor population is gradually dragging the country. In Bengal, the richest province in India, the total number of tenants is about ten millions, nine millions of whom hold less than 10 acres each, and two thirds of these less than two acres on an average. In much the same proportion, though in somewhat larger extent, the land in the other provinces is held by small occupiers. These are the people described by the Government of India (para. 21) "who dislike [illegible] courts and our judicial system." And it is upon their efforts that the main- [illegible] of the fertility of the soil, and its capacity to feed an increasing population, [illegible]efly depend.

[illegible]ot, therefore, share the confidence which is felt by the Government of India [illegible] that by recourse to land of inferior quality (now needed and used for the [illegible]of the working cattle), and through the industry of the poorest class of culti- [illegible] holdings are being reduced by increasing numbers to still smaller bounds, [illegible] continue capable of providing for enlarging wants as they arise. On [illegible]India, where there is either an abundant rainfall or the means of irri- gation, [illegible] advantages of the country may probably carry the increasing population fo[illegible]nsiderable time. But two thirds of the people are dependent on "dry" cultiva[illegible]ere the land, naturally less rich and without the command of water, is being gra[illegible] reduced in fertility by an exhaustive process of husbandry, while the people, w[illegible]ve no other means of living but by the land, are increasing [illegible]ning poorer. This is a danger which I early observed while in India, and it [illegible]ggravated by the unrestrained subdivision of holdings among the male [illegible] a family. The Government of India (para. 25) see no remedy for this [illegible]ssure of a dense population on itself. Sir Salar Jung acknowledged the [illegible]ity to me, but added, "It is the custom of the people to subdivide, and who can interfere with that?" Nature herself interferes by periodically cutting down by famine the surplus population. If we rest content with this, what becomes of the [illegible]d advantage of our rule to the people of India?

[illegible] opening up of, and migration to, rich jungle lands in various parts of [illegible]imited means of the cultivators has hitherto left untouched, there [illegible] remedy, an increased produce from the land at present culti- [illegible]ductive soil may be increased not only by enlarging its surface [illegible]erior land, but by working deeper into the naturally rich soil, [illegible]ich has for long ages lain untouched. In my report I stated [illegible], per acre, that could be added to the present produce of the [illegible]equal to the yearly maintenance of 22 millions of people. [illegible]n to be filled before a maximum produce could [illegible] power for the attainment of this in the insuffi- [illegible] of Ind[illegible] The present average produce is below 10 bushels [illegible] and progressive improvement in agriculture might raise this in [illegible] time to 12, 15, and even 20 bushels, and make the country safe fo[illegible] [illegible]rations. This is the great and indispensable work to be undertaken and [illegible]ed by any successful Government in India.

All interests in India are thus concerned in the improved cultivation of the soil. Th[illegible] landowner, whether Government or zemindar, the capitalist or local banker who find the current capital, the actual cultivator, and the landless labourer. These interest

prosper together or suffer together. The second and third are most closely connected and mutually dependent. Their natural position is that of a friendly partnership. So long as it was conducted on the old native principle of payment in "kind" there was a self-acting balance of mutual advantage. The cultivator paid his way in "kind" through the banker, who, after taking his profit, converted the crop into cash for the settlement of the Government and other demands. This system of payment in kind operated in favour of the land in two ways, first, by encouraging the cultivator to let the ground occasionally rest and recruit itself in fallow, as no rent could be exacted where no crop was produced, and, second, by requiring each cultivator to hold a larger area than he cropped, it acted as some check on over-population. The Government of India (para. 30) condemn my views on this point as being retrogressive and unsuited to modern circumstances, adding that the only cases in which produce rents are now common are in the holdings of petty occupiers and their sub-tenants. But the vast majority of the cultivators are of this class, and it is to their convenience and advantage that Government should chiefly give consideration. It is proper to add that, while I have expressed regret that a principle so well adapted to the circumstances of the small Indian cultivator had been gradually superseded, I was careful to admit the difficulty of now reverting to it in practice until first tested by competent trial.

I have been favoured with the perusal of a pamphlet on this subject within the last week, written recently by Mr. Wedderburn of the Bombay Civil Service. I met this gentleman at Ahmednuggar, where he was then in the position of judge, and was much impressed by the ability and earnestness with which his duties were performed, and the respect in which he appeared to be held by the Native population. Speaking the rigidity of the Government demand, he says, "the evil is quite a recent o
"of our own creation; it is the direct consequence of artificial innovations, b
"European ideas, and the most easy of all remedies is to return to the old
"the country, under which the inconvenience complained of never exist
"Native system of payment in kind, which gave the Government a proporti
"of the gross produce, was founded on natural convenience, enjoined by
"approved by immemorial custom, adjusting, as it did, the fiscal burd
"result of the harvest and the cultivator's power to pay." He s
which, under the old system of payment in "kind," the several int
vator, the capitalist, and the State may be mutually served
through it complete security, and a stimulus to improvement,
and honourable employment for his money, and the third
revenue. It further embraces a principle by which the mo
may purchase a permanent settlement in "kind," that will b
and to the State.

This, or freehold tenure acquired as described in my report, is the g
our aim should be directed. There are more ways than one of reaching it,
it be by this, or by such plans as are developed in my report, or by bo
be no safety to the people or Government of India till some self-acting pri
of progress are adopted. A system of which it can be said with too much tru
only that it exhausts the soil, but that the rent paid by the cultivators to the S
often doubled by the exaction of the lower class of Native officials
payment is demanded, admits of no defence. What is required on th
is a clear recognition of the problem to be solved, and a course
bring order out of blind routine, and secure their just reward to

With regard to Mr. Lyall's remarks (para. 36) on the syste
being seldom now practised in Native States, I was looking
cultivator rather than that of the prince. He probably take
collectors, in cash, but they for the most part take from the
crop in kind, converting that portion of it into cash whi
This is done in our own provinces in many cases. T
holds in Oudh 2,500 villages under the Government, desc
with great intelligence, his own practice. He holds under a s
during which he pays a fixed annual rent in cash to Government.
management of the tenants, from whom he takes their rent in kind,—o
produce on good land,—an amount paid, he said, without difficulty, and yet
than twice our usual demand. During the late famine scarcity in the North-
Provinces, this gentleman maintained all his people without aid from the State.

The Goverment of India have strangely misapprehended (para. 22) my cha
the costliness of litigation in India. I spoke of the cost as harassing and impoveri

the litigant. The Despatch argues that law is not costly to the State, as they charge fees amounting to 17 per cent. on the capital value of the property in litigation. In some cases, as I am informed, such stamps and fees amount to even 25 per cent., and as in the great majority of cases the decree goes against the indebted cultivator, the Court thus adds, for its trouble, one fifth to his previous debt! In the Small Debts Courts in Scotland the only charge incurred by the litigant is for delivery of the summons and calling the case in Court, which for any amount within 12*l.* (the limit of the Court's jurisdiction) does not exceed 3*s.* to 4*s.* paid to the officer and clerk for their trouble. No pleader is allowed, except by the authority of the judge, and to this either party may object. They appear personally, and the case is heard and disposed of in a few minutes. The judge disposes of a hundred or more such cases at a sitting. An appeal can only be taken in very exceptional circumstances, and is not made use of once in a thousand cases. The whole time occupied, from the issue of the summons to the decree of Court, does not exceed 15 days. Such is the cost and time spent on nineteen-twentieths of the litigation in a rich country like this. But so little do the high authorities in India appear to appreciate the question of cost and delay as affecting the helpless but embittered litigant of that country, that they write approvingly of a charge of 17 per cent. by the State, in addition to the costs of the suit, as not "inordinately costly," and a duration for a contested suit of 40 to 250 days, as not "excessive."

There are some subsidiary points in the Despatch of the Government of India which I will venture to notice with more brevity.

Para. 7. I have not, as there indicated, proposed that the Secretary of State should exercise authority over the separate Presidencies of India in the same sense as the Governors of Colonial Provinces. On the contrary, I desire increased authority and responsibility to be left with each Local Government in direct communication with the Secretary of State, like the Colonial Governments, but untrammeled by a distant Secretary in the Supreme Government of India.

Para. 10. In regard to the value of the exports and imports of British Burma as compared with Ceylon, I took my figures from the Statistical Abstracts for British India and the Colonies for 1877, which state the amount for the former at 5,424,000*l.* and for the latter at 11,616,000*l.*, figures which would seem still farther to prove the accuracy of my illustration.

Para. 18. The Despatch, while not agreeing with my view that the British Army would be the best school for training to the higher posts of the Civil Service other than that of the Law Courts, admits that military officers are the most competent for frontier or backward provinces. Surely, if found the best for the more difficult posts, they would not be unequal to the duties of the easier stations.

Para 37. I did not say that droughts are becoming more frequent, but that the exhausted soil is less able to withstand them. The Government of India express their "satisfaction that the condition of the people is improving, and their ability to support "themselves under such a calamity as an almost entire loss of their crops is in- "creasing." It is, I much fear, this feeling that has on more than one occasion prevented earlier action in famines, and thereby led to great mortality. Recent experience in Madras and the Deccan, and to a certain extent in the North-West Provinces, has not confirmed the soundness of the opinion here expressed.

Para. 39. The Despatch states that I must have misapprehended the fact in saying that in "some quarters" the land revenue was diminishing. I have not the figures before me at present, and cannot, therefore, quote those to which I referred. But the gross amount of the land revenue in 1870 was 21,088,000*l.*, and that for 1879–80, 21,679,000*l.*, a difference so small that it may be reckoned almost stationary for a period of 10 years, during which railway communication was greatly extending the facilities for trade. It is very remarkable that the doubling of the external trade should, at the same time, put forth in para. 41 as a proof of the prosperity of the years to have had no beneficial influence on the Land Revenue. May not rather show that the railways are carrying off more than it is safe for the agricultural class to part with?

Para. 45. The Government Despatch states, "It is incorrect to say that, if one third "of the cultivated area were irrigated, the country would be secure against drought, "as one irrigated acre will not feed three people, besides supplying seed grain and

"other requirements." One irrigated acre, manured, will produce two crops in the year, 850 lbs. at each time, equal to 1,700 lbs. This at 1½ lb per head per day will feed three persons for a year, and leave 330 lbs. over for seed and other requirements. My statement was, therefore, quite correct. Moreover, it seems to have been forgotten that not more than one fifth part of the country suffers drought at the same time.

Para. 46. The last point on which I feel it necessary to remark is the ground of objection expressed to my suggestion of an increased revenue from water-fed crops by a special tax, viz., that its unpopularity would cause a great reduction in the area sown with such crops. Any additional charge will, no doubt, be unpopular, but, inasmuch as the charge of two rupees an acre, suggested by me, would hardly be felt on rich land on the value of a water-fed crop of sugar cane or other garden crop, worth 100 to 200 rupees, it would be unreasonable to suppose that this would cause a great reduction in the area sown with such crops. In proof of this I may quote the words used by the Government of India, in the same Despatch (para. 28) speaking of tea land, "when an acre yields an annual crop worth 100 to 200 rupees, an acreage "fee of one rupee cannot operate as any practical check on the extension of the "industry." If, however, the same result can be obtained (as is suggested by the Despatch) by simply raising the rate of assessment on such lands, that would, no doubt, be an easier way to obtain the desired object. One way or other the State is entitled to a better rent on such productive land, and the people can well afford to pay it.

The concluding paragraph of the Despatch refers to the shortness of my stay in India, and my want of acquaintance with the language, habits, and customs of the people, as disqualifications for forming a sound opinion on the case. The first would be an objection equally valid in any case where a physician is called in for consultation, or a Viceroy, Governor, or other stranger to the country, is for the first time appointed to a leading post in India; and, in regard to the second, the variety of language, habits, and customs is so great that no one, even of the permanent residents there, can hope to master them. But the subject has been long under discussion. I was present at and took a very humble part in the discussions and divisions in Parliament 20 years ago, when the Government of India was taken from the Company and committed to the Crown, and have since attended Parliamentary Inquiries on Indian affairs, have carefully studied the evidence of the most capable administrators of the day. The opinions I have been led to form, whatever may be their value, are at least the result of long and careful study, completed and applied by personal observation and inquiry in India itself, and I venture to ask for them from your Lordship that calm consideration which the magnitude of the issues at stake would seem fairly to claim.

I have the honour to be,

My Lord Marquis,

Your Lordship's most obedient Servant,

(Signed) JAMES CAIRD.

The Most Honourable the Marquis of Hartington, M.P.,
Her Majesty's Principal Secretary of State
for India.

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Your Committee have not inquired into the various harbour or port improvements effected by local authorities with borrowed money, for this would have involved an investigation into engineering details and plans which they did not consider it necessary to make. Where such moneys are borrowed from Government they should be separately shown in the accounts, and any loans raised by the Government of India for such advances would be distinct from the loans raised for public works classed as productive. Harbour Works.

A suggestion was made to your Committee that a body analogous to the Public Works Loans Commissioners should be established in India to make advances to local authorities and municipalities. In this country the main advantage gained by the existence of the Public Works Commission is, that there is associated with the Government a body of bankers and merchants whose financial experience is valuable in dealing with schemes for public works proposed by local authorities. But there is no evidence that the intervention of such a body in India would be productive of practical advantage. Public Works Loan Commissioners.

At the same time it is, in the opinion of your Committee, essential that no loans to local authorities should be made except on the security of revenues derived from local sources fully adequate for the interest and repayment of the loans.

The existing establishment of Europeans in the Public Works Department in India is, in the opinion of your Committee, too large for the work they have to perform, and will be still more in excess under the reduced expenditure on public works proposed for the future. Further, the heavy cost of their maintenance reduces largely the profits otherwise attributable to the works with which they are connected. Establishments.

The European engineers employed have been drawn from various sources, and their degree of efficiency has been very various. At the same time the native employés are more and more becoming efficient assistants, and there is much reason to hope that a cheaper native agency may to a considerable extent be substituted for a part of the European agency hitherto employed. Your Committee therefore recommend that as opportunity occurs this change should be made as far as possible. It is the more necessary because existing circumstances seem to show that the present arrangements do not afford a sufficient flow of promotion to the junior officers of the European establishment, and that a demand is already arising for pensions and other arrangements by which the non-effective charges would be largely swelled, as has been the case in regard to the military and civil services. Your Committee would therefore recommend that the numbers admitted to Cooper's Hill with a view to their employment in the Public Works Department should be carefully adjusted with regard to the future requirements of the service, and that the establishments in India should be at once reduced.

In making these recommendations, your Committee have avoided laying down any but general principles capable of easy application, for they have no wish whatever to interfere with the functions of the Indian Executive, upon whom the responsibility of adjusting details according to changing circumstances, and to the varying requirements of different localities, must primarily rest.

In concluding their Report, your Committee gladly take an opportunity of expressing their appreciation of the great value of much of the evidence given before them, the careful arrangement of the masses of figures by General Dickens, as well as the thorough knowledge and preparation exhibited by him and other witnesses, which tended greatly to shorten and elucidate the complex inquiry your Committee were directed to make.

24 *July* 1879.

PROCEEDINGS OF THE COMMITTEE.

Tuesday, 24th February 1879.

MEMBERS PRESENT:

Mr. Sampson Lloyd.	Mr. John Cross.
Mr. Fawcett.	Lord George Hamilton.
Mr. Onslow.	Mr. Edward Stanhope.
Mr. Childers.	Mr. Balfour.

Lord GEORGE HAMILTON was called to the Chair.

The Committee deliberated.

[Adjourned till Thursday, the 6th March, at Twelve o'clock.

Thursday, 6th March 1879.

MEMBERS PRESENT:

Lord GEORGE HAMILTON in the Chair.

Mr. Childers.	Mr. Agnew.
Mr. John Cross.	Mr. Onslow.
Mr. Hardcastle.	Mr. Fawcett.
Mr. Edward Stanhope.	Mr. Ernest Noel.
Sir George Campbell.	Mr. Grant Duff.

Mr. *Juland Danvers* and Mr. *W. Sowerby* were severally examined.

[Adjourned till Friday, 14th March, at Half-past Twelve o'clock.

Friday, 14th March 1879.

MEMBERS PRESENT:

Lord GEORGE HAMILTON in the Chair.

Mr. Childers.	Mr. Agnew.
Sir George Campbell.	Mr. Ernest Noel.
Mr. Fawcett.	Mr. Onslow.
Mr. Sampson Lloyd.	Mr. Ashbury.
Mr. John Cross.	

Mr. *W. Sowerby* was further examined.

Sir *Thomas Seccombe* was examined.

[Adjourned till Thursday next, at Half-past Twelve o'clock.

Thursday, 20*th March* 1879.

MEMBERS PRESENT:

Lord GEORGE HAMILTON in the Chair.

Mr. Agnew.	Mr. Onslow.
Mr. John Cross.	Mr. Fawcett.
Mr. Ashbury.	Mr. Childers.
Sir George Campbell.	Sir Joseph M'Kenna.
Mr. Sampson Lloyd.	Mr. Edward Stanhope.
Mr. Ernest Noel.	

Sir *Thomas Seccombe* was further examined.

[Adjourned till To-morrow, at Half-past Twelve o'clock.

Friday, 21*st March* 1879.

MEMBERS PRESENT:

Lord GEORGE HAMILTON in the Chair.

Mr. John Cross.	Mr. Fawcett.
Mr. Onslow.	Mr. Agnew.
Mr. Sampson Lloyd.	

Sir *Thomas Seccombe* was further examined.

[Adjourned till Thursday, 15th May, at Half-past Twelve o'clock.

Thursday, 15*th May* 1879.

MEMBERS PRESENT:

Lord GEORGE HAMILTON in the Chair.

Mr. Childers.	Mr. Ernest Noel.
Mr. Fawcett.	Mr. Ashbury.
Mr. Onslow.	Mr. Hardcastle.
Sir George Campbell.	Mr. Agnew.
Mr. Sampson Lloyd.	Mr. Grant Duff.
Mr. Edward Stanhope.	Mr. Balfour.
Sir Joseph M'Kenna.	Mr. Mulholland.

The Committee considered Mr. Sowerby's application for expenses for attendance during the last Session, and decided that he had already received sufficient remuneration for the same.

DRAFT REPORT, proposed by the *Chairman*, read the first time, as follows:—

"INDIAN PUBLIC WORKS.

"1. YOUR Committee have throughout their inquiry kept carefully in view the limits of the reference made to them, and they have not considered it desirable to prolong their proceedings by taking evidence upon other branches of Indian Finance, except so far as was necessary to enable them to arrive at definite conclusions upon the specific subject referred to them for investigation.

"2. The expenditure connected with Public Works in India, from money raised on loan, differs from the other annual disbursements made by that Government, and included

in the annual revenue and expenditure accounts presented to Parliament, inasmuch as it is an annual investment deliberately incurred by borrowing in order to produce certain anticipated results.

"3. The information therefore obtained by your Committee, and the suggestions which they consequently are prepared to make, may be conveniently divided into three heads:

"1. The origin and growth of the present system of constructing on loan public works in India.

"2. Results of that system, so far as they can be ascertained.

"3. The alterations and safeguards which, considering the condition of Indian Finance, are, in the opinion of your Committee necessary to secure the prosecution of reproductive public works upon a safe and intelligible basis.

"THE ORIGIN OF THE PUBLIC WORKS DEPARTMENT.

"4. Previous to 1854 public works of all description were carried on by the engineer department of the army, under the superintendence of a military board in each of the three Presidencies. If the work required to be done was civil, engineers were lent to the Civil Department, or else the works were undertaken by the military board. The financial control exercised depended upon the nature of the undertaking; if military, the Military Department were responsible; if civil, the Home Department, or the local government within whose jurisdiction the work was carried out. Under this system of military supervision, as may be imagined, little was done to increase the productive power of India, in fact, the only civil works constructed previous to 1854, worth noticing, were portions of the Jumna and Ganges Canals and the Great Trunk Road to the North. All expenditure incurred under this system was treated as ordinary expenditure, and charged against the revenue of the year.

Questions 27 to 38.

"5. In 1854 Lord Dalhousie abolished the military boards, substituting in their place a chief engineer under each of the local governments, and at the same time forming a Central Public Works Secretariat at Calcutta for the general supervision of the local establishment, and out of the organisation thus instituted has been gradually developed the present Public Works Department.

"6. The works to be executed and the expenditure to be controlled, naturally divided themselves at the outset into two different heads:—

"1st. That relating to the maintenance and erection of civil and military buildings, the repair and construction of roads, and the other multifarious works necessary for the smooth and effective working, by the administration of a great empire.

2nd. The construction and extension of works of public utility, such as railways, irrigation canals and harbours, which although not absolutely necessary for purposes of administration, were calculated to increase the wealth, and promote the prosperity of the country.

"7. The cost of the first-named works, as being essential for purposes of Government, had, from the first, with one exception hereafter to be noted, been charged as ordinary expenditure against the revenue of the year, whilst those in the latter category have almost uniformly been made with borrowed money, though the agency by which they have been constructed, and the methods of borrowing, have greatly varied.

"8. As the investigations of your Committee have been mainly confined to the works constructed with money raised on loan, they do not consider it necessary to enumerate, from the formation of the Public Works Department to the present time, all the various alterations made in it by successive Viceroys. As its wants grew and its expenditure increased, the Department expanded into separate divisions, comprising at the present moment a military works branch, a civil buildings and roads branch, an irrigation branch, and a railway branch. It would also be beyond the province of their inquiry if the Committee were to trace the process of the policy of decentralisation commenced by Lord Mayo, by which a large and increasing portion of the works connected with civil building works and roads was transferred to the control of the various local governments, inasmuch as the cost of these classes of works are defrayed from the revenue of the year.

"9. A very large expenditure has been incurred during the last 20 years by the erection of barracks, in order to provide for the accommodation of the additional European forces stationed in India subsequent to the mutiny of 1857. This outlay was, in the opinion of the Indian Government, so necessary and pressing, that in 1865 and 1866 they requested leave to include it within the category of public works, the cost of which might legitimately be defrayed by loans. Although sanction was at one time given by the Secretary of State in Council to the request, yet it was so soon afterwards withdrawn and rescinded, that your Committee merely notice the transaction in order to express their strong opinion that all disbursements of this character should be included in the ordinary expenditure, and met by the ordinary revenue of the year.

"10. The

10. The only undertakings, therefore, with the exception of a few harbour works constructed for the enlargement of the great seaports of India, which have continuously been constructed out of loans, with the sanction both of the Home and Indian Government, are railways and irrigation works. A short account of the policy pursued in reference to each class of work will best illustrate what has been done, and with what result.

"RAILWAYS.

"11. One of the undoubted objects of Lord Dalhousie in substituting new machinery for the construction of public works was to provide for an augmentation of the expenditure upon works of public utility. In regard to the construction of railways, he proposed a form of guaranteed companies in which the companies were to receive a guarantee of 5 per cent. from the Indian Government on the capital raised by them for the construction of railways, their operations within certain limits being under the control of the Government. These proposals, with certain modifications, were finally adopted, and from 1846 to 1867 all railways constructed in India were made through the agency of the guaranteed companies.

"12. This policy, although it led to the rapid and continuous application of capital to railway extension in India, was not conducive to economy either in the execution of the work or in the working of the lines, and the Indian Government finding it difficult to obtain the consent of companies to the alterations in the contract necessary in their opinion to insure proper control and economy, determined to discard indirect agency, and undertake the works and the working of future lines themselves.

"13. A full and detailed statement of the reasons prompting the Government of India to take upon themselves this additional responsibility, will be found in a Minute in the Appendix, written by Lord Lawrence, and dated the 9th January 1869. In the main arguments of this Memorandum your Committee concur. From that time no fresh contracts, except for small extensions of existing lines, have been entered into with guaranteed companies; and the Indian Government have themselves raised the money and executed the works.

"14. The total amount raised by the guaranteed companies up to the 31st March 1878, was 95,420,309 *l.*, and the sums expended by the State, 18,636,321 *l.*, making a total of 114,056,630 *l.*

"15. This expenditure has given to India, up to April 1878, 7,552 miles of railway, of which 5,913 miles are constructed on a gauge of 5 ft. 6 in., 1,639 miles on a gauge of 3 ft. 3 in. Mr. Danvers' Report, 1878.

"16. Although the railway system of India is by no means complete, yet the mileage connects Bombay, Madras, and Calcutta, traverses India from north to south, and, by passing through the great plains, places railway communication within reach of almost all the great towns of the country. It may therefore fairly be said to have almost completed the great trunk lines originally designed.

"17. The following Table gives the annual rate at which this railway outlay has been incurred, from the year 1845–46 to 1877–78.

YEAR.	Guaranteed Railways.	State Railways.	TOTAL.	YEAR.	Guaranteed Railways.	State Railways.	TOTAL.
	£.	£.	£.		£.	£.	£.
1845–46	—	—	—	1863–64	4,755,653	—	4,755,653
1846–47	—	—	—	1864–65	4,122,240	—	4,122,240
1847–48	—	—	—	1865–66	5,636,866	—	5,636,866
1848–49	—	—	—	1866–67	7,297,703	—	7,297,703
1849–50	75,893	—	75,893	1867–68	7,120,081	594	7,120,675
1850–51	99,263	—	99,263	1868–69	3,867,927	552,398	4,420,325
1851–52	351,323	—	351,323	1869–70	4,742,851	190,870	4,933,721
1852–53	427,560	—	427,560	1870–71	3,776,270	449,372	4,225,642
1853–54	670,649	—	670,649	1871–72	2,496,728	644,620	3,141,348
1854–55	1,730,156	—	1,730,156	1872–73	477,245	1,413,649	1,890,894
1855–56	3,366,411	—	3,366,411	1873–74	693,053	2,354,625	3,047,678
1856–57	3,515,100	—	3,515,100	1874–75	1,087,911	3,014,180	4,102,091
1857–58	3,423,068	—	3,423,068	1875–76	950,806	3,165,184	4,115,990
1858–59	5,492,108	—	5,492,108	1876–77	715,459	2,865,861	3,581,320
1859–60	7,171,464	—	7,171,464	1877–78	1,312,250	3,984,968	5,297,218
1860–61	7,578,715	—	7,578,715				
1861–62	6,602,212	—	6,602,212				
1862–63	5,863,344	—	5,863,344	£.	95,420,309	18,636,321	114,056,630

"18. The capital expenditure of the guaranteed companies was not shown in the Revenue and Expenditure Accounts presented annually to Parliament, the only charges in connection with their outlay being the amount annually debited against the revenue of the year, to make good the difference between the interest guaranteed, and the net receipts received by the Government, and the cost of supervision and of land provided for the lines.

"19. When,

"19. When, however, the State undertook the construction of railways, the capital annually so expended was termed Extraordinary Expenditure, and though placed outside the ordinary expenditure was charged against the revenue on the understanding that, if the revenue were unable to meet this charge, the funds might be obtained by borrowing. As a matter of fact, a considerable portion of the Extraordinary Public Works expenditure has been met by surplus revenues. Your Committee proposes to treat all such Expenditure as borrowed money, it being obvious that the surpluses so absorbed might otherwise have been applied to the reduction of existing liabilities, and that a separation of the capital account, either of railways or of irrigation works, into two portions, one bearing and the other not bearing interest, would make the real cost or profit of such works to the State a matter almost beyond the possibility of calculation.

"IRRIGATION.

"20. The annual uncertainty and great variation of the rainfall renders cultivation in many parts of India precarious and fruitless without the storage and distribution of water, and to meet this ever recruiting difficulty irrigation works of all sizes and methods have for centuries past been in existence in these districts. Many of these beneficent works were destroyed by the internecine wars preceding the establishment of British rule, whilst the number and utility of those left was much diminished by want of repairs, disuse, and decay. It is impossible to estimate what the value, in a pecuniary sense, was of the works so transferred or left to the British Government by the Native rulers. Certain sums were from time to time, previous to the establishment of the Public Works Department, expended in their repair and extensions; this expenditure was small, distributed without much method, and bore but little result.

"21. Lord Dalhousie was desirous of annually expending a certain sum raised on loan in promoting irrigation, and in establishing the Public Works Department he designated two millions sterling as the sum to be annually so applied. His retirement and the outbreak of the Indian Mutiny postponed the carrying out of these proposals.

"22. In 1858, great pressure being brought upon the Government of India to promote irrigation by the same means, as they were then extending railway communication, the Madras Irrigation Company was formed, with a Government guarantee of 5 per cent. upon a capital of 1,000,000 *l.*, and a few years after another private company undertook, without any guarantee, the construction of a system of irrigation canals in Orissa. Both these experiments have proved costly failures to the State. The arrangements between the Secretary of State in Council and the Orissa Company soon became so involved that it was considered advisable to terminate them by the purchase of the works of the Company at a valuation much above their market value. This sale was effected at a time when the company was practically bankrupt. The Madras Irrigation Company since its formation has succeeded for one year only in meeting its working expenses. The Secretary of State has, in addition to the guaranteed rate, advanced, free of interest, 600,000 *l.* to the directors of the companies, of which 228,000 *l.* has been repaid; 1,372,000 *l.* has, therefore, been swallowed up by this undertaking, without any return whatever to the State.

"23. Warned by these fiascos of private enterprise, the Government of India determined to construct themselves all irrigation works for the future. This decision was arrived at in 1867, and from that time all expenditure upon the extension of irrigation works likely to be remunerative, has been, together with State railways, termed extraordinary, and the money required has been obtained by borrowing.

"24. Treating all irrigation expenditure as money raised on loan, we find that the total expenditure up to 1876-77 was 17,635,779 *l.*

	State.	Madras Irrigation and Canal Company.	TOTAL.
	£.	£.	£.
Up to 1866-67 inclusive - - - - -	6,612,495	964,833	7,577,328
1867-68 to 1876-77 - - - - - -	9,651,618	406,833	10,058,451
TOTAL - - - £.	16,264,113	1,371,666	17,635,779

"25. The expenditure upon irrigation extension may therefore be said to have passed through three phases, firstly, for the period from the establishment of our rule to 1854, when the annual disbursements were small and spasmodic, and met from revenue; and secondly, from 1854 to 1867, during which time the experiment of private companies was tried in addition; thirdly, from 1867, the date of the extraordinary public works policy, under which all sums were undertaken by the State, and a sum from one to two millions sterling was devoted annually to their prosecution.

"26. The

"26. The existing establishment of the Public Works Department being supposed to be inadequate to the new demands thus imposed on it, in 1870 an engineering college was established in England for the supply of highly trained engineer officers, and in 1874 a new member was added to the Viceroy's Council, to personally superintend the policy and control the expenditure of the department to which the construction of railways and canals in India was to be solely entrusted.

"27. In 1873 the Public Works Department sent home a forecast as to the probable results of a proposed annual expenditure for the next five years of four millions and a-half sterling, three millions to be devoted to railways, one and a-half to irrigation.

"In 1875 a revised forecast was received, in which the proposed expenditure was reduced to four millions annually; 2,700,000 *l.* for railways, the remainder for irrigation; the actual expenditure for the last three years has been, in:—

"1876–77 - - - - - - - -	£. 4,031,320
"1877–78 - - - - - - - -	4,638,035
"1878–79 - - - - - - - -	4,551,000

"Details of this outlay will be found in the Appendix.

"28. The policy embodied in this increased outlay was originally justified on the assumption that the works comprised in the category of, and sanctioned as, Public Works Extraordinary, would, with few exceptions, prove remunerative, that is, that the direct receipts from them would more than meet the interest of the sums expended on their construction, plus their working expenses. How far this assumption has been realised will be seen when your Committee consider that portion of their inquiry relating to—

"The results, financial and otherwise, of the railways and irrigation works already *constructed or sanctioned.*

"29. The direct annual gain or loss to the State from railway outlay since 1858, is as follows:— Railway results.

YEAR.	GUARANTEED RAILWAYS. Capital Raised to end of each Year.	Capital withdrawn for Expenditure to end of each Year.	Net Traffic Receipts, less Moieties of Surplus Profits Repaid to Companies.	Guaranteed Interest.	Loss or *Gain* to State	STATE RAILWAYS. Capital Expended.	Net Traffic Receipts.	Interest at 4½ per Cent.	Loss or *Gain* to State.	TOTAL Loss or *Gain* to State.
	£.	£.	£.	£.	£.	£.	£.	£.	£.	£.
1858-59	22,998,405	19,151,531	232,365	838,411	606,046	- -	-	- -	- -	606,046
1859-60	28,573,287	26,322,995	403,057	1,199,929	796,872	- -	-	- -	- -	796,872
1860-61	34,397,817	33,901,710	389,413	1,485,745	1,096,332	- -	-	- -	- -	1,096,332
1861-62	42,979,539	40,503,922	391,162	1,788,153	1,396,991	- -	-	- -	- -	1,396,991
1862-63	48,218,541	46,367,266	625,615	2,166,755	1,541,140	- -	-	- -	- -	1,541,140
1863-64	54,332,994	51,122,919	821,548	2,456,182	1,634,634	- -	-	- -	- -	1,634,634
1864-65	57,541,917	55,245,159	1,129,851	2,683,787	1,553,936	- -	-	- -	- -	1,553,936
1865-66	60,860,247	60,882,025	2,865,574	2,889,241	23,667	- -	-	- -	- -	23,667
1866-67	67,258,917	68,179,728	2,347,085	3,031,087	684,002	- -	-	- -	- -	684,002
1867-68	76,571,751	75,299,809	1,989,112	3,480,677	1,491,565	594	-	14	14	1,491,579
1868-69	82,417,905	79,167,736	2,229,509	3,881,013	1,651,504	552,992	*1,879*	12,455	13,834	1,665,338
1869-70	86,773,325	83,910,587	2,627,941	4,126,025	1,498,084	743,862	*790*	29,180	29,970	1,528,054
1870-71	91,426,816	87,686,857	2,556,707	4,341,609	1,784,902	1,193,234	68	43,585	43,517	1,828,419
1871-72	93,550,303	90,183,585	2,877,153	4,542,183	1,665,030	1,837,854	*4,063*	68,199	72,262	1,737,292
1872-73	93,736,915	90,660,830	2,554,485	4,608,418	2,053,933	3,251,503	5,362	114,510	109,148	2,163,081
1873-74	94,725,814	91,353,883	3,241,189	4,617,923	1,376,734	5,606,128	*6,474*	199,297	205,771	1,582,505
1874-75	95,119,118	92,441,794	3,454,848	4,643,901	1,189,053	8,620,308	44,982	320,095	275,113	1,464,166
1875-76	95,072,441	93,392,600	3,729,034	4,637,891	908,857	11,785,492	96,027	459,131	363,104	1,271,961
1876-77	94,833,129	94,108,059	4,433,151	4,658,681	225,530	14,651,353	88,621	*587,525	498,904	724,434
1877-78	96,313,173	95,420,309	5,396,790	4,655,285	*741,505*	18,636,321	127,774	*737,479	609,705	*131,800*
		£.	44,295,589	66,732,896	22,437,307	£.	350,128	2,571,470	2,221,342	24,658,649

* These amounts are taken from the Finance and Revenue Accounts. The other sums in this column are estimated.

"30. No accurate comparison as to the financial results of the two different systems of railway construction can be drawn from the above Table. The continuous annual application of capital to any particular object must always leave that portion of the outlay expended in works, not yet in operation, unproductive. So long as the guaranteed system was in force, a certain proportion of the capital of the companies thus remained fallow. When the indirect agency was abolished and State construction substituted, the amount of work remaining to be finished by the Company, and the capital necessary for its completion, annually diminished, until the whole of their capital may now be said to be bearing some return. On the other hand, a very large proportion of the State expenditure sunk in railways is locked up in railways not yet completed. Your Committee have, therefore, combined the results derived from both systems.

"31. The above Table shows that this railway expenditure has not, in the strict sense of the word, been remunerative, for in every year except 1877-78 the State has been obliged to furnish a considerable sum to meet the difference between the net receipts and the interest due on the capital raised.

"32. On the other hand, these works have undoubtedly been productive; and notwithstanding the increase to the capital account by annual borrowing, the return upon the whole expenditure is annually improving, and the loss to the State annually diminishing.

"33. Your Committee, however, in pointing out this undoubted result, feel bound to again lay emphasis on the fact that this portion of the public works, constructed on loan, is not in itself directly remunerative, although they, for reasons hereafter to be stated, do not question the expediency of appropriating for the present, from the revenues of India, a certain sum annually to make good the loss caused to the State by the construction of railways in India.

"34. If the annual loss had not been met out of the general revenues of India, but had been yearly added to the capital actually expended, the results as regards the returns would have been far less advantageous to the railways. On the other hand, your Committee have not taken into consideration any of the indirect benefits directly traceable to railway communication, such as enhancement of the value of land, the opening of new markets, the impetus given to the export trade, the reduction in military establishments from greater power of transport and concentration, and the many other benefits derived from rapid and easy inter-communication in a territory of the enormous area of India.

"35. Without in any way ignoring these collateral gains, it must be remembered, that originally the policy of borrowing for the construction of public works was promoted on the ground, not that the indirect benefits would be a sufficient compensation for the direct financial loss, but that the State would have the benefit of a remunerative return, in addition to indirect advantages.

"36. The returns derived from irrigation works which have in part or wholly been made by borrowed money are somewhat complex, and at present incomplete.

"37. No estimate has been, or can be, given of the pecuniary value of the old native works to which additions have been made by the Public Works Department. For instance, the capital expenditure on one of the Madras Works, upon which a very large return is claimed, does not include the value of the old work upon which the British undertaking was founded. The Public Works officers, examined before your Committee, do not, however, consider that the value of these old native works, even if it could be accurately ascertained, would make any appreciable difference in the returns claimed from the works constructed more recently.

Irrigation results.

"38. The revenue derived from irrigation is termed direct and indirect. By direct receipts is meant the water-rate paid for the use of the water; by indirect, the enhanced value of the land due to the vicinity of the canal or tank. As, however, the systems of land tenure and assessment differ, so the method of payment for the use of the water varies. In the Bengal Presidency, that portion of the land revenue due to irrigation can not only be traced, but is annually included in the returns presented by the Accountant of the Public Works Department.

"39. In Madras and Bombay, where a different form of land settlement has been established, some difficulty has been experienced in separating the payment for water from that for the use of the land; so much so that the only returns your Committee have been able to obtain, through General Dickens' investigation, is not complete as regards the receipts from certain of the Madras works, whilst to none of the works in Bombay proper is any indirect revenue credited. The Scinde returns are, however, complete.

"40. This statement (which will be found page 422 of the Appendix) is compiled in accordance with the instructions sent to the Government of India by the Secretary of State in Council, by which, for the first time, an attempt was made to present annually to Parliament, in a concise shape, the actual financial result of the irrigation expenditure. Previous to that time all the interest due on money raised on loan and sunk in irrigation works was included in the interest payable on the general debt, and was not shown in a separate statement; the working expenses were included under the head of Public Works Ordinary, whilst on the revenue side the whole indirect receipts were returned as part of the land revenue, the only sums credited to irrigation being the direct payments made in the shape of water rates.

"This arrangement was very misleading, and so long as it was continued it was difficult even for officers of the Public Works or Financial Departments to ascertain the exact annual financial results of the expenditure, whilst the task was wholly beyond the means either of individual Members of your House or of the general public.

"41. Your Committee accept, therefore, as sufficiently accurate for the purpose of showing the loss or gain on the whole irrigation expenditure, the following statement, furnished

furnished by General Dickens, with the assistance of the Financial Department of the India Office, for the year 1875-76 :—

Total Expenditure.	Total Receipts.	Working Expenses.	Interest 4½ per Cent.	Excess; Revenue.
£.	£.	£.	£.	£.
15,562,655	1,228,993	396,750	700,319	131,924

"42. This return is, at first sight, satisfactory; but a further analysis is necessary before your Committee can make clear the probable result of a continuation of the present irrigation expenditure.

"43. Taking the local provinces separately, the following Table shows the great variation in results:—

	Total Expenditure.	Total Receipts.	Working Expenses.	Interest.	Excess or Deficiency.
	£.	£.	£.	£.	£.
Bengal - - -	4,072,742	23,043	52,949	183,237	—213,179
North West Provinces	4,939,527	375,659	145,015	222,279	+ 8,465
Punjaub - - -	3,335,503	288,360	136,214	150,097	+ 2,049
Scinde - - -	667,704	161,368	- -	30,047	+ 132,103
Bombay - - -	665,938	4,090	- -	29,967	— 25,877
Madras - - -	1,881,241	376,473	62,572	84,656	+ 229,245

"44. This classification brings out in strong contrast the use made of the works by the inhabitants of different provinces; Scinde irrigation, according to the above figures, giving a return of 19·66 per cent. on a capital of 667,704 *l.*; Bengal, a loss of 5·23, on a capital of 4,072,742 *l.* The Madras return does not include the Madras Irrigation Company.

"45. If from the sum total of the above works the revenue is deducted due to certain works, a remarkable fluctuation is again shown. The main revenue of the Punjaub and North West Provinces is derived from the Ganges and Jumna canals, and in Madras the Cauvery, Kristna, and Godavery works supply the whole revenue, the remaining works showing an excess of expenditure. In Scinde all the irrigation works, with a single exception, are remunerative. Classifying the works as below, we get the following remarkable results :—

	Capital.	Return after meeting Interest and Working Expenses.	Per Centage.
	£.	£.	£.
Scinde Irrigation Works - - - - -	667,704	132,103	19·66
Ganges - - - - - - - -	2,826,479	42,808	1·51
East Jumna - - - - - - -	231,743	47,946	20·68
West Jumna - - - - - - -	432,764	84,010	19·42
Cauvery - - - - - - -	116,072	108,923	81·30
Godavery - - - - - - -	736,444	94,351	12·94
Kristna - - - - - - - -	463,590	45,630	9·8
£.	5,474,796	555,771	
The remaining works, including the Madras Irrigation Company - - - - -	10,197,869 1,372,000	— 421,859 — 46,453	
£.	11,569,869	— 488,312	

"It is also worthy of notice that, according to this statement, no single canal in Bengal pays even its working expenses.

"46. This very great variation is due, in the opinion of your Committee, not to accident or engineering mistakes; on the contrary, the general causes of failure and success can be so easily traced, and are so intimately connected with the second part of their investigation, the effect of these works in preventing or mitigating famine, that both should be considered together.

"47. The various famines which during the last century have devastated different parts of India have all mainly, if not entirely, arisen from drought.

"48. It is therefore too frequently assumed that as want of rain is the primary cause of failure of crops, the prevention of famine could be easily and profitably accomplished by the State undertaking, in all parts of India, works for the storage and distribution of water, whose utility would be so readily recognised by the population in their vicinity as to render their construction remunerative to their promoters and reproductive to the locality.

"49. These wholesale assumptions altogether ignore the enormous area of India, the difference between the physical conformation, soils, crops, and climate of its various provinces, and above all the very great variation in the rainfall.

"50. Sir George Campbell (a Member of your Committee), in his evidence, gave a detailed account of the rain supply of India, as well as of the course and ordinary movement of the monsoons supplying that rainfall. A map published in the 1872-73 Statement of the Moral and Material Progress of India, so well illustrates his observations, that your Committee have deemed it advisable to reprint it.

Upper India.

"51. The great plains of India, north of the Vindhya Mountains, may be divided for meteorological purposes into the tracts traversed by the Indus and other rivers passing through the Punjaub to the Arabian Sea, and those watered by the Ganges and Jumna on their way to the Bay of Bengal.

"52. The greater part of the south-western portion of the first plain is practically rainless for a few miles south of Lahore; the average annual rainfall is less than 10 inches, and even this small fall diminishes as the Indus runs seawards. Cultivation throughout the whole of this area is impossible, unless the river water is utilized. The financial results of the inundation and irrigation canals here are satisfactory. The population is sparse, and entirely dependent upon the water of the rivers, the supply of which is constant, the sources of the river Indus and its tributaries being derived from the ice and snow of the Himalayas.

"53. A considerable portion of the Punjaub, though more favoured in its rainfall, is still greatly dependent upon artificial means for an adequate supply of water. The North-West Provinces and Oude are still more fortunate; in fact, in proportion as the Ganges approaches the sea the rainfull increases, both in intensity and regularity, reaching at Calcutta an average of about 80 inches, whilst further east the supply of rain is above 100 inches.

"54. Without attempting a minute classification of the density of population throughout Upper India, your Committee feel justified by the general concurrence of the evidence taken before them, in pointing out certain natural conclusions. Cultivation being impossible without rain, the greater and more regular the rainfall the greater will be the population of those districts. Reversing the proposition, it may also be assumed that the smaller and more irregular the rainfall is, the sparser will be the population of that locality. The cultivation of irrigated land being more expensive than that of land watered by rain, in those districts where the rainfall is usually sufficient, the cultivator is more loth to take advantage of irrigation than where he is more dependent upon artificial supplies.

"55. When, however, a drought occurs and a failure of crops ensues, the difficulty of meeting the food wants of the district will, to a very great extent, vary according to the density of population. The less liable in ordinary years a locality is to drought, the more dense in all probability will the population be. If the Government, impressed by the sufferings of a population so affected, embark in wholesale irrigation works for their future protection, they must be prepared to find, when the recollection of the disaster has passed away, that the very cause of their apprehension, the thickness and density of the population, renders it less probable that the works constructed will prove remunerative.

"56. Yet the financial results of works of irrigation are, in the opinion of your Committee, the best and only test of their utility. A railroad may traverse between its termini certain districts which it does not very materially improve, yet the work may be on the whole beneficial to the country. Unless, however, an irrigation work benefits the immediate locality in which it is placed it can be of no use to outside districts. If the cultivators permanently decline to take advantage of its offers, the inference is that the work does not accomplish the only purpose for which it is made.

"57. The

"57. The general results of irrigation in the Bengal Presidency fully justify your Committee in adopting these deductions. In Bengal proper no work is sufficiently reproductive to repay its working expenses; yet nowhere in India is the population more dense, and within the last 13 years three famines of unusual severity have afflicted its provinces. All these works were promoted and sanctioned as safeguards against drought, though not as famine preventive works, unlikely to pay in ordinary years, but as profitable investments for which loans might safely be raised.

"58. In the North West Provinces and the Punjaub the rainfall is less and the return better; though even here the general result would financially be very unsatisfactory if it were not for the revenue of the Ganges and Jumna Canals, which were constructed under very favourable circumstances, and in plains eminently suitable to irrigation.

"59. General Dickens, in his evidence, stated that the development of irrigation was slower than had been anticipated, and Colonel Crofton corroborated his statement by saying that 10 years, in his opinion, was an insufficient time for the full development of any large irrigation work. The financial effect of this slow growth of revenues shown by the forecast of the Public Works Department of 1875 (page 409).

"60. From that statement it appears that in 1872–1873, the income from irrigation works was 50,232 *l.* Between that date and 1879–1880, it is proposed to spend a sum of upwards of 10,000,000 *l.* sterling in extending irrigation, and the result is estimated to be charge at the end of that period upon the revenues of India of 156,541 *l.*, in place of the income at first obtained.

[These accounts do not include any returns from the Bombay and Madras Works, upon which an expenditure of 2,000,000 *l.* is contemplated, although the charge for interest on this money is included.]

"This proposed expenditure is in connection with those undertakings which in the opinion of the officers of the Irrigation Department are most required, and most likely therefore to prove remunerative. It may therefore be safely asserted that if that proposed expenditure be much increased, the return upon it, proportionally, will be even less satisfactory.

"61. The financial result of the large irrigation works in Upper India is such as to preclude, in the opinion of your Committee, the financial possibility of so extending them as to give general immunity from drought, even assuming, which is very questionable, that their unlimited extension would have that effect.

"62. The areas protected by existing works in the Bengal Presidency were given (page 96, Question 1398), by Colonel Rundall, in a Paper laid by Lord Northbrook before your Committee, as expressing to a great extent his views. Taking the cultivable area of the three divisions of the Presidency, he states that out of an area of

56,000 square miles in the Punjaub - - - -	17,000 were protected.
40,000 square miles in the North Western Provinces -	25,000 were protected.
78,000 square miles in Bengal - - - - -	12,000 were protected.

"Colonel Crofton, the Inspector General of Irrigation in India, generally confirms these figures, although he considers the area protected in the North West Provinces to be considerably less. (Question 1398, and following.)

"63. This return was given in 1874, large expenditure having meanwhile occurred in extending works; the area protected now is considerably greater.

"64. The revenue and canal officers estimate that if one-third of the cultivable area were actually irrigated, or capable of being irrigated, that would be sufficient protection for the remaining two remaining two-thirds.

"65. The increasing quantity of wheat and other food-products exported annually from Bengal, proves that the food supplies are annually in excess of the wants of the population, although the distribution may be uneven and the want of communication between, and access to, different localities so defective as to cause periodically great local suffering.

"66. To render Upper India secure against periodical visitations of scarcity and famine must be the work of time. The gradual completion of the railways now in course of construction, the prosecution of roads and other means of communication, and of irrigation works, only when likely to be remunerative, together with such measures as may generally ameliorate the condition of the agricultural classes, is the action, in the opinion of your Committee, the most likely to achieve that end.

Madras and Bombay.

"67. Your Committee will now investigate the results of the irrigation works in the Presidencies of Madras and Bombay, the works in the Central Provinces not having attained sufficient maturity nor being of such dimensions as to call for special notice.

"68. The

"68. The average rainfall throughout Southern India greatly varies, but the zones of variation and their cause can be easily defined and traced when the sources of rain supply are considered and described.

"69. The south-west monsoon strikes with great force the western coast, south of Surat; it is then stopped by the Western Ghauts, so that eastward of this barrier the supply is so suddenly reduced as to cease altogether further inland. The Coromandel cost is chiefly watered by the north-east monsoon; but this rain supply diminishes in quantity as it proceeds eastwards and inland.

"70. The country comprised within the Madras and Bombay Presidencies may be divided into three distinct zones, although it may be more convenient to classify them separately by Presidencies, taking Bombay first.

"71. First in rainfall comes the tract of country west of the Ghauts, and south of Surat, receiving from the south-west monsoon a supply of from 70 to 100 inches annually. Next, a long slice of territory lying directly eastward of the Ghauts, but expanding as it stretches northwards, with a rainfall of from 30 to 40 inches. The remainder of the Presidency is comprised within the great tract of upland country in the interior of the peninsula, and receives little of either monsoon, the rainfall of the whole area averaging less than 30 inches.

"72. Of the Madras seaboard only a small portion receives a rain supply of above 40 inches; these exceptions being a small district around the town of Madras and a portion of the northern circars. The whole of the Presidency remaining may be divided, as Bombay, into two areas, the one receiving from its proximity to the sea a rainfall of over 30 inches, the other being further inland and coming within the compass of the dry tract of less than 30 inches, which also contains the whole of the native state of Mysore and a large portion of Hyderabad.

"73. All the important rivers of this vast tract run eastwards, but only three, the Kristnah, the Godavery, and Cauvery, derive their sources from the rainfall on the Western Ghauts. Even if there were sufficient rivers, independent of the local rainfall, and upon whose supplies reliance in years of drought could be placed, the conformation of the land is not favourable to great irrigating canals such as have been constructed in Upper India upon the great plains. The broken and upland character of the rising table lands, both of the Deccan and Southern India, render the system of wholesale canal irrigation in many of the inland districts impracticable, except at an impossible cost.

"74. The population, moreover, throughout the whole of this area is very considerable, and is, in proportion to the rainfall, more dense than in almost any other part of India, for throughout the whole of Southern India, excepting the Koncan (that tract lying between the Western Ghauts and the sea), the average rainfall is nowhere more than sufficient, and, in an enormous area, very insufficient for purposes of agriculture.

"75. The people are, moreover, extremely poor, and in certain tracts their indebtedness is greater, and the power of the moneylender more supreme than elsewhere in India.

"76. Neither is there much trade or commerce between the towns to compensate for the want of wealth of the agricultural communities; the net receipts of the only railway in Madras being far from sufficient to meet the interest guaranteed upon its capital.

"77. In no part of India are there found so many native irrigation works. They consist chiefly of tanks for the storage of rainwater, and are said to number in Madras alone, including all kinds, over 40,000. Anicuts or dams across running rivers, with connecting canals have, in certain places inland, also been constructed.

"78. These works do not, however, come strictly within the cognizance of your Committee's reference, for they are outside the category of works constructed with loans, and the great majority of them were made antecedent to the establishment of British rule.

"79. A list of those works in Bombay and Madras which are within the limits of your Committee's inquiry, will be found at page 422 of the Appendix of last year's proceedings.

Bombay.

"80. The return from Bombay is so incomplete that no conclusions can be drawn from it. Colonel Fife, late Chief Engineer for irrigation in Western India, however, stated in his evidence that the return both upon the works opened, as well as upon those partially in operation, was about ½ per cent. in excess of working expenses. He attributed this result partly to the size of the existing establishments, originally framed to carry on a larger expenditure than has since been sanctioned, and also to the disappointingly slow growth of the income (Question 1956). In his opinion works properly designed in the Deccan would yield 5 per cent. in 15 years from their first commencement, and this yield would increase to 10 per cent., although for the first two or three years they would not probably meet their working expenses.

Delta Navigation.

"81. The Madras Works, constructed with borrowed money, and in operation, chiefly consist of works in the Deltas of the large rivers; the only works paying being those in the Godavery, Kristnah, and Cauvery Delta, to which an excess of revenue of 12·94, 9·8,

and

and 81·30 per cent. is respectively credited upon the capital expended. No account is, however, taken, in the case of the Cauvery works, of the native anicuts; but making all due allowance for this omission, these works reflect great credit upon the officers who designed them and carried them out.

" 82. The conditions under which they worked were, however, especially favourable, not only to irrigation, but to that combination of irrigation and navigation which is the chief characteristic of this system.

" 83. The area to be irrigated consisted of flat, sandy, alluvial plains, without roads, through which passed a great and constant supply of river water independent altogether of the real rainfall, and capable of being easily controlled and directed to any part of the surrounding delta. If, in other parts of India, similar conditions existed, your Committee would have little hesitation in recommending an expenditure for carrying out works, the receipts from which show that they are both useful to the cultivator and remuerative to the State.

" 84. The account which your Committee have, however, given of the climate and conformation of Southern India, show that not only do not these same favourable conditions elsewhere exist, but that they are in many districts reversed. For a very large portion of the country is unsuited to canal irrigation, and the supply of river-water, with three exceptions, is precarious.

" 85. During the prolonged drought of 1876–77 the vast majority of the rainfed tanks were either dry or their contents so reduced as to be of little utility. If, then, a drought continues for more than a year, it is clear that tanks, to be a preventative against such a continuance of dry weather, must either contain more than a year's supply of rain or be connected with streams whose sources are independent of the rainfall.

" 86. The problem, therefore, to be solved, and the importance of which has been prominently brought before your Committee by the terrible mortality, notwithstanding the enormous State expenditure, during the late Madras famine, is, taking into consideration both the present condition of Indian finance and the natural physical difficulties to be overcome, to prescribe the practical policy to be adopted the most likely to diminish the prospect of a recurrence of such a calamity in Southern India.

" 87. Your Committee are aware that a Special Commission have been appointed by the Government of India to locally investigate the causes and magnitude of this disaster, and to report upon the remedies to be adopted. This Commission have had the means of obtaining evidence on the spot, and of eliciting from native witnesses information and particulurs which it is not possible for your Committee to attempt.

" 88. Without, however, in any way infringing upon the functions of this tribunal, or attempting the specific and detailed recommendations (which a local inquiry would alone justify), your Committee feel it their duty to consider the proposal laid with much confidence before them by Sir Arthur Cotton. This scheme, though applicable to the whole of India, was based upon his personal experience, mainly derived from the working of the irrigation works in the deltas of Madras. **Sir A. Cotton's schemes.**

" 89. Sir Arthur Cotton proposes the summary and indefinite suspension of nearly all railway schemes and works. He would, however, devote 10,000,000 *l.* annually for the next 10 or 20 years to irrigation works, mainly canals (*see* Question 2922); the main canals to be of such dimensions as to permit navigation. By such an expenditure he estimates that 100,000 miles of main line navigation would be constructed, costing 30,000,000 *l.*, dealing with the most populous districts, the remainder to be spent on feeders.

" 90. Sir Arthur estimates such an expediture would give a large return to Government (2751), though your Committee were unable to ascertain the data of this conclusion, especially as he does not consider it within his province to consider how or at what rate of interest the money expended would be raised. Neither has he in any way attempted to estimate or make provision for the immediate rise in the cost of material and labour which so sudden and simultaneous an expenditure throughout India must inevitably produce.

" 91. The figures already embodied in this Report show how few of the most carefully examined irrigation schemes have proved remunerative, and these returns are more than confirmed by Sir Arthur Cotton himself, who, in reply to a question asking him to indicate what works constructed by the Government of India, during the 20 years, other than those in the Madras Delta, had proved remunerative, replied, " None of the great works pay yet." (Question 2214.)

" 92. It is evident to your Committee that this scheme, though of gigantic dimensions, is of too shadowy and speculative a character to justify their noticing it, except for the purpose of emphatically rejecting it.

" 93. That the works in the deltas, with which Sir Arthur Cotton's name is so honourably associated, are a success, has been admitted by your Committee. On the other hand, the Orissa works, the Madras irrigation works, and the navigation works of the River Godavery, with which his name has more recently been connected, are complete failures.

" 94. Your Committee cannot, however, pass without comment the insinuation, more than once repeated by him, that the failure of these works was due to the whole power of the Government being exercised against their completion, on account of their dread of cheap transit. (Questions 2322, 2362.)

" 95. The Government were, in the opinion of your Committee, right when, in the exercise of their discretion, they declined to invest further sums in undertakings which, from their commencement, belied the estimates and returns upon which alone they were sanctioned.

" 96. Neither can your Committee admit that the failure of past navigation schemes is due to want of ability or energy on the part of the officers entrusted to carry them out. On the contrary, they were most favourably impressed by the candour, knowledge, and ability of those officers of the Public Works Department who appeared before them.

" 97. If the Government have sanctioned in the past faulty estimates and speculative schemes, their error is mainly due to thus placing too great reliance in the hasty generalisations of engineers who, over-sanguine by the success of their undertakings, have ignored the conditions under which alone their success was achieved, and without which success was impossible.

" 98. A strong consensus of opinion has been expressed by those best acquainted with Southern India that more might be done in assisting by advances, or otherwise, the inhabitants to extend and make themselves tanks and other depositories for water. Your Committtee consider this point well worthy of the notice of the Indian Government, for the impression seems well founded that since the establishment of the system of " Public Works Extraordinary " too much attention and money have been concentrated on the prosecution of those great engineering works, which, though more likely to enhance the reputation of those who carry them out, are less beneficial, in proportion to their cost, than the humbler undertakings of the old village commuities.

" 99. A special Famine Insurance Fund, to the amount of 1,500,000 *l.*, was established in 1878-79 by the Government of India, of which a certain portion was to be devoted to the construction of famine preventive works. Whenever any portion of this fund is so available, there is, in the opinion of your Committee, no part of India in which it could be more advantageously utilised than in promoting small irrigation works in Southern India.

" 100. In concluding this portion of their Report, your Committee do not feel justified in drawing any comparison between the comparative utility of railways and irrigation works during years of plenty or periods of scarcity, for local considerations must largely influence any such comparison. Neither are the means at hand by which the indirect benefits attributable to railways can be estimated, as is the case with irrigation. Every work of either kind must be judged by itself; for instance, water communication may, in certain parts parts of India, be the natural means of transit, yet to prescribe hastily for the whole of India water as the only means of communication, would result in the absurdity of attempting to construct canals intended for navigation in hilly barren districts, devoid of rain and rivers, and with little population.

" 101. Your Committee have not been able to obtain thoroughly reliable accounts, in the new prescribed form, of all the details of undertakings promoted by loans later than 1875-76, the irrigation returns since then not being sufficiently complete for any purpose of comparison.

" 102. Taking, however, the forecast of the Public Works Department in 1875, the comparison with the actual results realised by railways with those anticipated, is noteworthy.

" FORECAST OF PUBLIC WORKS DEPARTMENT IN 1875.

YEARS.	CHARGE ON REVENUE DUE TO			
	Guaranteed Railways.	State Railways.	Irrigation Works.	Entire Operations.
	Charge.	Charge.	Income.	Charge.
	£.	£.	£.	£.
1872-73 - -	2,271,557	136,371	50,232	2,357,696
1873-74 - -	1,589,789	255,730	64,686	1,780,833
1874-75 - -	1,230,170	361,435	25,900	1,565,705
1875-76 - -	1,684,000	460,823	Charge 34,571	2,179,394
1876-77 - -	1,496,000	469,679	45,241	2,010,920
1877-78 - -	1,442,000	497,265	83,041	2,022,306
1878-79 - -	1,313,000	527,765	122,441	1,963,206
1879-80 - -	1,215,000	568,265	156,541	1,939,806

" STATEMENT

"STATEMENT showing the Annual Loss or GAIN on account of PUBLIC WORKS EXTRAORDINARY in each of the undermentioned Years.

YEAR.	Guaranteed Railways.	State Railways.	Irrigation.	TOTAL.
	£.	£.		
1872-73 - -	2,214,991	109,148	Can only be given for Bengal, North Western Provinces, and Punjab, as at pages 400 and 401 of last year's Blue Book.	
1873-74 - -	1,529,172	205,771		
1874-75 - -	1,244,347	275,113		
1875-76 - -	992,170	363,104		
1876-77 - -	277,263	498,904		
1877-78 - -	+ 675,085	609,705		

"103. The capital invested in railways in 1872-73, was—	£.
Guaranteed - - - - - - - -	90,660,830
State - - - - - - - - -	3,251,503
TOTAL - - - £.	93,912,333

"On which a loss was sustained of—	£.
Guaranteed - - - - - - - -	2,214,991
State - - - - - - - - -	109,148
TOTAL - - - £.	2,324,139

"In 1877-78 the capital was—	£.
Guaranteed - - - - - - - -	95,420,309
State - - - - - - - - -	18,636,021
TOTAL - - - £.	114,456,630

"Gain or profit on—	£.
Guaranteed - - - - - - - -	+ 675,085
State - - - - - - - - -	— 609,708
TOTAL - - - £.	+ 65,280

"104. The very startling contrast of the above figures is greatly attributable to the enormous food traffic on the railways during the Madras famine of 1876—1878, a traffic very much due to the high prices in Southern India, and to the reduction in the freight charges, of which reduction the Government have borne one-half. Making, however, every allowance for this abnormal traffic, the railway returns show a gratifying elasticity, whilst the very fact that so enormous a quantity of food was carried by them to administer to the wants of a starving population, indicates their utility in saving life during times of famine or local scarcities.

"CONCLUSIONS AND RECOMMENDATIONS.

"105. Your Committee are of opinion that the expenditure upon railways and irrigation, the results of which they have analysed, though not remunerative, has, upon the whole, been beneficial to India. That although considerable sums have been wasted and certain useless schemes undertaken, yet the policy of continuing to borrow for productive public works, may, within the limits and restrictions hereinafter laid down, be continued.

"106. In deciding what the restrictions should for the future be, your Committee must consider, first, what the regulations have been in the past, how far they have failed,

and whether their failure is due to the unsoundness of the principles laid down, or to the difficulty of enforcing them.

"107. Sir Thomas Seccombe, the late Financial Secretary of the India Office, gave in his evidence a clear and succinct summary of the correspondence between the Secretary of State in Council and the Viceroy, which had taken place on this subject. The general tendency of that correspondence has been a desire on the part of the Home authorities to limit the construction of works by means of borrowed money to such works as might be expected to be remunerative, and for which the necessary loans could be raised in India, and on that of the Government of India, whilst admitting the soundness of that principle, to substitute a fixed annual charge on the revenues in respect of productive works, and to proceed with the construction of other works, provided that the fixed annual charge be not exceeded.

"108. The most distinct enunciation of opinion on the part of the Home authorities was a Despatch of Lord Salisbury in 1874, in which were laid down definitely three distinct principles. 1st. That no works were to be constructed with loans, except those likely to be remunerative (*see* Question 432), by yielding in the shape of annual income a sum equal to the interest on the money expended on their construction, including interest during construction. 2nd. That famine preventive works might be made out of revenue of the year, but if that proved insufficient recourse might be made to borrowing. 3rd. That all loans for public works be raised in India, it being expedient to increase the home charges in this country. The first of these rules did not apply to works already sanctioned and commenced.

"109. In 1876, the following proposal was made by the Government of India in a letter to the Secretary of State. 'The principle by which our expenditure upon "extraordinary" public works has been guided is, that however advantageous the extension of railroads or irrigation works may be, it would not be right to carry them on at such a rate as would require the imposition of fresh taxes. The rate of expenditure has accordingly been regulated by calculations which are given in detail in the forecasts of 1873 and 1875. These calculations show that any additional interest on account of money borrowed for the purposes of constructing "extraordinary" works, will be met from the increased receipts derived from similar works which have been or will, from time to time, be completed and brought into operation. We consider that this method of calculation, which has now been tested by the experience of three years, is safe, and that it enables the Government to control the expenditure upon "extraordinary works" more efficiently than if works were to be admitted under that category merely upon the faith of estimates of the returns which they may give, for such estimates are not unfrequently fallacious.' To this request a refusal was sent, Lord Salisbury adhering to his previous rules, but admitting an exception in regard to works under construction.

"110. During the financial years 1877–78 and 1878–79 additional taxation was imposed in India to establish an Annual Famine Insurance Fund of 1,500,000 *l.* That amount was fixed with reference to the famine expenditure, excluding loss of revenue which, during the last six years, had amounted to the enormous sum of 14,487,827 *l.*, of which a very large portion had been met by borrowing.

"The object, therefore, of this Famine Insurance Fund, was, by increasing the revenue, to prevent the constant additions to the debt of India which the prevention of periodical famines would entail, by either applying that increase of income to works likely to avert famine, and thus obviate famine expenditure, or by reducing annually debt contracted for famine, so that if famine expenditure should again become inevitable, the reduction of debt made in years of prosperity would compensate for the liabilities incurred during scarcity.

"This increase of taxation was sanctioned by the Secretary of State in Council, on this understanding.

"111. Last September, the Home Authorities received a Despatch from the Indian Government adverting to the difficulty of discriminating between works strictly productive and those only admissible as providing against the effect of famine, and proposing (Question 458) 'to accept a yearly maximum dead-weight charge, to be fixed, as experience may suggest, for works constructed as productive, whether under the existing strict conditions, or as now proposed, in order to prevent famine, or give protection from famine, or diminish the expenditure for the counteraction of famine, if it occurs. In other words,' they 'would limit to a specific maximum amount the net expenditure for the interest on the capital cost of all such works and their maintenance, after setting off all the net income yielded by the works.' That amount they would for the next five years fix at 25 lacs of rupees in any one year, in addition to their 'existing net liabilities,' and they thought that the Famine Insurance Fund of one million and-a-half sterling might be safely reduced by that sum 'on the consideration that the construction of any works not fully productive, according to the existing definition, which may be thus facilitated, will cause an equivalent reduction of the ultimate liability on account of famines when they occur.'

"112. The first portion of this proposition had been already suggested by the India Government in 1876, and rejected by the Secretary of State in Council. The latter part of the suggestion, by which it is proposed to permanently assign and mortgage 25 lacs of rupees

rupees of the Famine Insurance Fund, in order to raise money for the construction of famine works, not fully productive, is an entire invertion of the object for which the Fund was raised. This increase of taxation was justified as necessary in order to meet, as far as was possible, famine expenditure for the future out of income; to immediately appropriate a portion of the income so raised to pay the interest of new loans was a proposal which, in the opinion of your Committee, the Secretary of State in Council had no option but to reject.

"113. It is clear, therefore, that the principle so consistently laid down by the Secretary of State in Council, that no works, except those likely to be remunerative, were to be constructed with loans, has hitherto failed in practice, and when your Committee examine the process through which the estimates and plans of large public works pass previous to their sanction, it is evident to them that no ordeal has or can be suggested by which with any certainty a return can be ensured.

"114. If the return from public works which have been, or are about to be, promoted in India was certain to produce 4½ per cent., the rate of which interest is charged against the loans for the construction, private enterprise might be expected to undertake them without a guarantee. It is, however, because there is no element of certainty as to their yielding any such income that private enterprise has hitherto, with few exceptions, and those disastrous failures, declined, without guarantees or great concessions, to embark in these enterprises.

"115. The yield from railways may so improve that the present reluctance may be overcome as regards their promotion, though in the present state of the exchanges it is not probable, but irrigation works, must on account of the relations between the Government and the cultivators, be undertaken by the State alone.

"116. Even in this country, with all the publicity and criticism which great engineering enterprises invoke, schemes are constantly undertaken by companies which financially are complete failures. Yet every individual shareholder, before investing his money, has satisfied himself that there was a reasonable prospect of his investment proving remunerative.

"117. In India, where there is little or no publicity and still less extraneous engineering talent ready to criticise and suggest, the investigation to which projects emanating from the Public Works Department must be subject is slight compared with that of private enterprises in this country. If an able engineer, confident in his power to overcome natural difficulties, puts forward a scheme which, if his figures be realised, will confer great benefits upon the locality affected, and if, after subjecting this scheme to examination, the Finance Department are unable to detect any flaw in its estimates, the Government of India would, in all probability, under existing rules, unhesitatingly sanction it, as complying with the condition that it will be remunerative.

"118. When sanctioned and commenced, unforeseen difficulties may occur, the price of labour and material may rise, or possibly some hurricane, flood, or drought may seriously disturb the whole plan of the work, and little by little the prospect of remuneration may vanish, until it may become doubtful if the work will pay more than its working expenses.

"119. The remedy which in such cases is suggested, is to transfer the work to those within the category of ordinary and construct it out of ordinary revenue. This, however, is only possible if there is a surplus, provided there be no surplus, money must be borrowed, or the work postponed; if there be a surplus, and a portion of it be absorbed in an unremunerative work, financially speaking, that sum would have been better employed in reducing debt.

"120. Moreover, whenever a work is transfered to the ordinary account, and nominally constructed out of current income, no charge is made for interest against the sums, whether they have been borrowed or not, expended in its construction. If it brings in any revenue the ordinary income of the year is swelled by it, but all account of its cost is lost sight of. It is difficult, therefore, to conceive any procedure by which greater facilities are offered to the Public Works Department to efface 'all bad bargains,' than to lay down a rule by which works, on account of their failure to comply with the sole condition upon which they were sanctioned, may be transferred to an account where they are lost sight of.

"121. It is evident to your Committee that if the best and most efficacious control over the expenditure of a Department, situated as the Public Works Department is, in India, is to be obtained by an intelligible form of account giving the capital expenditure, working expenditure, and interest of every large undertaking, it is of paramount importance, if we are to apply to this account the test of results, that those works which pay the least, and have in proportion to their income cost the most, should be included, and not excluded, from that account.

"122. Your Committee approve of the forms of account prescribed by the Secretary of State in Council in 1877, and filled up by General Dickens. They are at present incomplete, both as regards the returns from Madras and Bombay, as well as the proportion

tion of the general central establishment charges and superannuation allowances which should be charged against that portion of the Public Works Department employed in connection with the Public Works Extraordinary Expenditure.

" 123. The experience of the past will doubtless, in future, make the Finance Department more careful before sanctioning, and the Public Works Department less sanguine in promoting public works of a reproductive character. Yet the short tenure of appointment in India, as well as the constant change in the *personnel* of the high officials of that Government, renders some more consistent and permanent check advisable.

" 124. The whole of the expenditure upon these works, being now treated as capital outlay to be obtained by borrowing, renders it apparently possible to adopt a permanent system of control, either by annually limiting the capital expenditure itself, or else, as suggested by the Government of India, by limiting ' to a specific maximum amount the net expenditure for the interest on the capital cost of all such works and their maintenance after setting off all the net income yielded by the works,' and within the limits allowing the contracting of capital liabilities. Your Committee will consider the last proposal first.

" 125. The result of this productive expenditure, so far as at present can be ascertained, has placed an annual but varying loss upon the revenues of India. The proposal of the Government of India, last September, was to accept for five years as a dead weight upon Indian revenues this loss, adding to it 25 lacs of rupees to pay for the interest of sums raised for new famine protective works. In other words, their proposal would have ultimately placed at the disposal of the Public Works Department an income composed of, 1st, the receipts from these works; 2nd, a sum termed ' dead weight ' sufficient to establish an equilibrium between the income derived from and current expenditure connected with these works ; and, 3rd, 25 lacs of rupees.

" Provided, therefore, the interest on the sums borrowed did not exceed the aggregate of this income, works might be constructed to any extent.

" 126. For two reasons your Committee cannot accept these suggestions. First, because the adoption of such a plan would be the admission of the principle that works, sanctioned and constructed as remunerative, might afterwards be accepted as a permanent charge upon the revenues of India; and, secondly, because the scheme affords no check whatever to the possible and ultimate amount of that charge.

" 127. As the capital account of productive works annually increases, every year's increase means a larger sum of interest to be paid, and a larger charge for maintaining and managing works in operation. Unless, therefore, the development of revenue from these works is proportionately progressive, the amount of ' dead weight ' cannot remain stationary, but will annually vary, being dependent upon the amount of the receipts from the works to which it refers. But these receipts greatly fluctuate, especially during years of famine, as is shown by the account just received from India, from which it appears that the revenue of these works is,—

		£.
" 1877–78.	Actual Accounts - - - - -	7,319,679
" 1878–79.	Regular Estimates - - - - -	6,569,000
" 1879–80.	Budget Estimates - - - - -	6,856,000

" 128. So far, therefore, from the plan in question affording any data on which an opinion could be formed as to undertaking new works, propositions for new works made after a year of comparatively good financial results might be sanctioned, which would be rejected if the results of the same year had been unfavourable, and thus, instead of the determination of the Government being guided by the prospect in regard to the works proposed to be undertaken, it would be influenced by the favourable or unfavourable result in the most recent year of works long previously commenced, and wholly or partially completed.

" 129. It is futile, therefore, to attempt to control capital expenditure by assigning a certain sum out of the revenues of India, as the limit beyond which no liability is to be incurred unless the receipts or revenue to which this sum is added can be equally regulated and estimated. As this cannot be done, this, and any other method of control based upon this principle, may be dismissed from consideration.

" 130. The only other practicable check is to limit the amount of the annual capital outlay, it being, in the present financial condition of India, a primary object to diminish, as soon as is possible, the annual loss upon the reproductive expenditure.

" 131. Your Committee, after careful consideration, are prepared to make the following recommendations :—

" That the construction of new works from borrowed money for the future be limited to those schemes alone which may be expected to be productive by yielding, in the shape of annual income, a sum equal to the money expended on their construction, including interest during the construction.

" That 2,500,000 *l.* be the maximum of the amount to be raised in any one year by the Indian Government (in addition to existing liabilities), for the prosecution of productive public works.

" That

"That the debt so incurred be kept separate from the permanent or general debt of India

"That all sums expended in the above works be treated as borrowed money, and interest charged against the work in which they are sunk.

"That whenever it is proposed to apply a part of the surplus revenue of the year to the construction of these works the following method of account be adopted:—

"(*a.*) That the sum proposed to be so expended be first applied to the reduction of debt other than that raised for public works.

"(*b.*) That the amount of the Permanent or General Debt thus nominally paid off be transferred to the capital account of those productive works upon which it is to be sent.

"That the accounts of the Public Works and Financial Department be reconciled, so that in future there may be only one accepted official account relating to productive works.

"That a full statement of the income derived from, and expenditure (both current and capital) upon these works form an integral part of the annual Financial Statement of the Government of India.

"132. To this last consideration your Committee attach great importance. The danger of raising fresh loans in India will diminish in proportion as the contribution from the general revenue of India for the payment of the interest due upon them decreases. If, year by year, this amount diminishes, and year by year the public works receipts increase, such a confidence will be established in the productiveness of these works as may induce local authorities or private individuals to undertake them without a guarantee or concession.

"133. The danger to the finances of India of the present system is, that the security for the interest upon all loans for public works is upon the general revenue of India, and not upon the productiveness of the work constructed. Your Committee are unable to suggest any other means of counteracting this vicious tendency other than the recommendations they have already made.

"134. The impolicy of raising loans in this country for public works in India is more than ever apparent to your Committee. Yet the difficulty of enforcing this regulation is very evident from the evidence of Sir Thomas Seccombe, who states that notwithstanding the great reluctance of the Home authorities to borrow here, yet the force of circumstances has been so strong that since 1873-74 out of loans amounting to 31,877,279 *l.*, 10,990,779 *l.* only has been raised in India, the remainder, 20,886,500 *l.*, having been obtained in England. Of this sum, 4,500,000 *l.* was for the redemption of certain East Indian Stock, making a total addition to the public debt of over 27,000,000 *l.*

	£.
The expenditure upon famine relief during the same period was	14,487,827
Upon productive public works	25,341,076
£.	39,828,903

the difference between the sum borrowed and expended being met out of revenue and the cash balances.

"135. The difficulties of the past six years have no doubt been abnormal, the famine expenditure in India having at times so depleted the cash balances as to render them insufficient to meet the drafts of the Secretary of State, whilst the exchange difficulties prevented the Secretary of State, at other times, from obtaining purchasers for his drafts upon India, although there were the requisite funds in the treasuries there.

"136. Your Committee, whilst making allowance for these difficulties, desire to express their emphatic opinion that loans for public works in India should not be raised in England.

"They concur, therefore, in the communication of the Secretary of State to the Viceroy, in which he requests that, whenever it is possible, a certain portion of the Famine Insurance Fund should be remitted to this country, to enable him to reduce the obligations which he has incurred here to meet famine expenditure in India.

"137. Your Committee have not inquired into the various harbour or port improvements effected with borrowed money, for they would have involved an inquiry into engineering details and plans which they did not consider it necessary to make; they recommend, however, that all money advanced for harbour or other works which any local government may wish to undertake with money raised on loan, be shown as advances repayable in the accounts, and that no such advance be made unless interest upon it be guaranteed by the local government requiring it.

"138. A suggestion was made to your Committee that a body analogous to the Public Works Loans Commissioners should be established in India to make advances to local authorities and municipalities. As your Committee have ascertained that the only resources from which these advances could be made would be the cash balances of or

loans raised in the name of the Indian Government, they are not disposed to make any recommendation by which any portion of the control now exercised by the Finance Department over those funds should be invested in other hands.

"139. The existing establishment of Europeans in the Public Works Department in India are, in the opinion of your Committee, unquestionably too large for the work they have to perform, and the heavy cost of their maintenance reduces largely the profits otherwise attributable to the works with which they are connected.

"140. Your Committee therefore recommend that an immediate reduction take place of the number annually sent out from Cooper's Hill, as well as of existing establishments in India, and that the Natives of India be more largely utilised than before.

"141. Summarising their recommendations, your Committee are of opinion,—

"That the expenditure from loans on Public Works may be continued to an amount not exceeding 2,500,000 *l.* per annum ;

"That all loans for public works be raised in India ;

"That all works upon which borrowed money be expended be included in the category of extraordinary or productive, and interest charged for the whole sums expended upon them ;

"That the annual accounts giving the results of this expenditure be completed and filled up so as to show the whole cost, including a share of general establishment charges and superannuation allowances ;

"That an immediate reduction be made in the Public Works Establishments.

"142. In making those recommendations, your Committee have avoided laying down any but general principles capable of easy application, for they have no wish whatever to interfere with the functions of the Indian Executive, upon whom the responsibility of adjusting details according to changing circumstances, and to the varying requirements of different localities, must primarily rest.

"143. Your Committee gladly take, in concluding their Report, an opportunity of expressing their appreciation of the great value of the evidence given before them, the careful arrangement of the masses of figures by General Dickens, as well as the thorough knowledge and preparation exhibited by him and other witnesses, which tended greatly to shorten and elucidate the complex inquiry your Committee were directed to make."

DRAFT REPORT read a second time, and considered paragraph by paragraph.

Paragraph 1, *agreed to.*

Paragraph 2.—Amendment proposed, in line 4, to leave out the word "investment" in order to insert the word "outlay"—(Mr. *Sampson Lloyd*),—instead thereof :—

Question, put, That the word "investment" stand part of the paragraph.—The Committee divided:

Ayes, 9.	Noes, 4.
Mr. Agnew.	Sir George Campbell.
Mr. Hardcastle.	Mr. Fawcett.
Mr. Ashbury.	Mr. Onslow.
Mr. Ernest Noel.	Mr. Sampson Lloyd.
Mr. Edward Stanhope.	
Mr. Childers.	
Sir Joseph M'Kenna.	
Mr. Balfour.	
Mr. Grant Duff.	

Amendments made.—Paragraph, as amended, *agreed to.*

Paragraphs 3—31, *agreed to.*

Paragraphs 32—33, *disagreed to.*

Paragraph 34.—Amendments made.

[Adjourned till Thursday, 12th June, at Half-past Twelve.

Thursday, 12*th June* 1879.

MEMBERS PRESENT:

Lord GEORGE HAMILTON in the Chair.

Mr. Ernest Noel.	Sir George Campbell.
Mr. Childers.	Sir Joseph M'Kenna.
Mr. John Cross.	Mr. Agnew.
Mr. Sampson Lloyd.	Mr. Hardcastle.
Mr. Fawcett.	Mr. Mulholland.

Paragraph 34, further considered, and *agreed to.*

Paragraph 35.—Amendments made:—

Question put, That this paragraph, as amended, stand part of the proposed Report.—The Committee divided:

Ayes, 6.	Noes, 4.
Mr. Hardcastle	Mr. Ernest Noel.
Mr. Agnew.	Mr. Sampson Lloyd.
Mr. Childers.	Sir George Campbell.
Mr. Fawcett.	Mr. Mulholland.
Sir Joseph M'Kenna.	
Mr. John Cross.	

Paragraphs 36—59, amended, and *agreed to.*

Paragraph 60, *postponed.*

Paragraph 61, *agreed to.*

Paragraphs 62—64, *postponed.*

Paragraphs 65—95, *agreed to.*

[Adjourned till Thursday next, at Half-past Twelve.

Thursday, 19*th June* 1879.

MEMBERS PRESENT:

Lord GEORGE HAMILTON in the Chair.

Mr. Grant Duff.	Sir George Campbell.
Mr. Sampson Lloyd.	Mr. Childers.
Mr. Onslow.	Mr. John Cross.
Sir Joseph M'Kenna.	Mr. Fawcett.
Mr. Ernest Noel.	Mr. Hardcastle.
Mr. Ashbury.	Mr. Balfour.
Mr. Agnew.	Mr. Edward Stanhope.

Paragraph 97, *disagreed to.*

Paragraph 98:—

Question, That this paragraph stand part of the proposed Report.—The Committee divided:

Ayes, 8.	Noes, 4.
Mr. Agnew.	Mr. Ernest Noel.
Mr. Balfour.	Mr. Fawcett.
Mr. Ashbury.	Mr. Onslow.
Sir George Campbell.	Mr. Sampson Lloyd.
Mr. Childers.	
Sir Joseph M'Kenna.	
Mr. John Cross.	
Mr. Grant Duff.	

Paragraphs 99—101, *agreed to.*

Paragraphs 102—103, *postponed.*

Paragraph 104, amended, and *agreed to.*

Paragraph 105.—

Amendment proposed in line 1, to leave out from the word "Railways" to the end of the paragraph, in order to insert the words: "hitherto incurred has been, on the whole, beneficial to India, both on general grounds, and as affording the best security against famine; for, while many previous famines have afflicted great parts of India, history shows no case in which the food supply of the whole continent of India has been seriously deficient, if only the means of transport and distribution be available. They consider it to be shown that many of the earliest irrigation works in the most favourable situations (most of which were undertaken by native governments, and developed by the British Government) have been eminently beneficial to the country, and that all over the country vast numbers of small works of irrigation, undertaken by communities and individuals, have been equally successful; but that in a large proportion of the greater irrigation works more recently undertaken by the British Government, the cost has been so great, compared to the immediate advantages, that it is still very doubtful whether these latter works can be considered reproductive and beneficial. They have not been able to obtain sufficiently detailed information regarding the great harbour and other works constructed with money borrowed on the credit of the revenues of India, those works having generally been entrusted to local governments, municipalities, and port trusts, to whom the money borrowed by the Government of India was advanced by way of loan; and many of these works are still so incomplete that it would be difficult to judge of the result; but so far as they can learn from the evidence before them, it appears that some of these works have been successful and remunerative, while in other cases the result is doubtful.

"The only other form in which money has been largely borrowed for public works is where municipalities have raised loans in the open market for purposes of municipal improvements. These loans are, it is believed, almost entirely confined to the three presidency towns, where great works have been undertaken by this means; but we have not thought that we could extend our inquiry to these works.

"Looking to these results, your Committee are of opinion that the railway system of India should be again carefully scrutinised, and that any additional lines which may reasonably be expected, in the light of the experience now gained, to be directly remunerative, should be undertaken, the money being borrowed for the purpose. They think that the more recent experience of great irrigation works points to caution on that subject, and that it would therefore be well to watch further the results of the works already in progress before very largely extending works of this class. At the same time your Committee think it of great importance that in the higher and drier provinces measures should be taken to facilitate the construction of small local works of irrigation in the manner indicated in the 97th para. of this Report. In the less level parts of the country experience has not been favourable to the attempt to create cheap water communications, and it seems to be principally in the flat and deltaic districts that such works can be undertaken with advantage.

"Seeing the generally local or provincial character of the harbour and other works to which reference has been made, your Committee think that, as a rule, they should only be constructed when some local guarantee for a reasonable return on the capital expended can be obtained.

"The population of the presidency towns and other municipalities, is, as regards its European element, of so floating a character, and, as regards its native element, is yet so little educated in political affairs, that in the opinion of your Committee a very careful supervision should be exercised by the Government over the borrowing powers of these bodies.

"No doubt among works of all classes there may be some which are likely to be extremely beneficial to the country without being directly remunerative. Especially in regard to works of irrigation, it was at one time considered that the immense effect of great works of this kind in saving the country from famine, might justify their construction even when the direct return is comparatively small. The inquiries of your Committee tend, however, to show that the protection from famine afforded by works of irrigation must always be to some degree local and partial, while any failure of such works in extraordinary seasons may be very disastrous. On the whole, then, considering the uncertainties that must attend the best considered undertakings, and the conditions of Indian Finance, they think it best to adhere generally to the rule laid down in 1874, that no works are to be undertaken from borrowed money unless they may reasonably be expected to be directly remunerative. They consider that to be safe such works should both return a fair interest on the money expended, and provide a moderate sinking fund calculated on the capital expenditure. As a rule, works which cannot be so classed, if constructed at all, should be constructed out of revenue. At the same time they recognise the extreme difficulty of ensuring beforehand that projects accepted as remunerative shall really be so, and they feel the necessity of very careful safeguards and restrictions

tions with a view to that end. Whatever the degree of care exercised, it must be expected that there must be some disappointments; but such a degree of stringency should be exercised in testing and checking projects that the general result, taking together those which have exceeded and those which have fallen short of expectations, should not be financially unfavourable.

"In considering the expediency of borrowing money for the classes of works above described, it must be borne in mind that the circumstances of India are at present such that private enterprise does not undertake works of the kind; and, therefore, in comparing the expenditure incurred by the Government with that in other countries we must take into account not only direct Government expenditure, but the capital invested in public works by companies and other bodies. In that view the total amount now expended in India is, after all, small compared to the enormous amounts expended in the United Kingdom and in some other countries. If such a return should be secured as to make the works commercially remunerative, it might be hoped that some railways and other works might eventually be undertaken by private capitalists. On the other hand, it is generally believed that the most economical and cheap systems of railway communication have been obtained in those countries where the Government have either undertaken the work, or at least designed and supervised it. And in the case of irrigation works, since in India the Government is not only the protector of the people, but also practically the head landlord, there are great objections to allowing the supply of water for irrigation to be monopolised by any private body. For the present, then, it seems inevitable that these works should be undertaken by or under the control of Government, and that in estimating the expenditure to be incurred from public loans, this condition of things should not be lost sight of.

"While, as above stated, your Committee are of opinion that the construction of public works in India should ordinarily be limited to works likely to be directly remunerative, they also feel that India has been so much cut off from the rest of the world by difficulties of communication, and the low value of labour and produce, compared to the prices prevailing in other countries, points so much to the advantage to be derived by the people of India from removing those difficulties, that there may be some cases in which works to facilitate communication may properly be undertaken, although the return is not direct. Seeing the difficulty of immediately raising large sums by taxation, it might be allowable to raise money on loan for such purposes, provided the projects are thoroughly well considered, and provided revenues are made securely available for paying the interest and sinking funds on such loans, either by establishing a permament surplus of general revenue (a part of which might be in some sort hypothecated for such loans), or by charging them on local or provincial rates similarly pledged for the purpose. The case of ordinary roads constructed with borrowed money in this and other countries may be instanced in support of this view. It has been sometimes attempted to raise a direct revenue from such roads in the shape of tolls; but both in India the disadvantages of that system were found to be great, and in this country also it is now generally deemed more expedient to abandon the tolls, and charge the roads on the rates. Considerable rates have already been raised in many parts of India both for local and provincial purposes, and works of undoubted utility might in some cases be advantageously constructed by loans raised on the security of those rates, provided the necessities of the future are not unduly forestalled. In that view great caution will be necessary. At the present time the general revenues of India leave no margin which can be applied as security for works not directly remunerative; and till such a margin can be established your Committee could not recommend further burden on the general revenues of India.

"In regard to any reduction of the present annual expenditure on public works, this important practical consideration must be borne in mind, that the Government have entertained a great public works establishment, and are pledged to very large numbers of public officers whom it would be impossible to dismiss without large compensation or liberal pensions. The question, therefore, must be considered, not so much with reference to the immediate circumstances of the present hour, as with a view to the determination of a permanent policy.

"Looking, then, to the vastness and the productiveness of India, to the decadence of old works and the absence of new works during several generations, and to the general success of the railway system, and of some other works undertaken in recent times, it appears to your Committee that what is required is not a rigid restriction of expenditure, but such restrictions as will secure both that the works undertaken shall be those which are most necessary and useful, and that the expenditure is either prudent in a commercial point, or covered by an adequate security in the shape of special rates and taxes. If works proposed to be undertaken do not fulfil these conditions they should not be undertaken at all. And, on the other hand, if works recognised as fit to be undertaken are to be constructed, it is better to avoid the evil of constructing them by driblets, which leads to great delay and to much loss of interest during construction.

"With respect to the prudence and profitableness of great public works, it appears to your Committee that a main cause of such failures as have hitherto

occurred lies in the too great separation of the Public Works Department of the Government of India from the civil administration. For instance, in the case of great irrigation works, it may be observed that most of these which have hitherto proved unprofitable were not demanded or desired by those interested in the localities or by the civil administrators responsible for those localities, but were, as it were, imposed on them by zealous and excellent engineer officers whose engineering knowledge was great, but who were not equally acquainted with the climatic, agricultural, and social conditions necessary to make the work remunerative. In that view it is the opinion of your Committee that greatly improved checks may be obtained by extending the system of local responsibility for future works:"

—(Sir *George Campbell*)—instead thereof :—

Question, "That the words 'and irrigation' stand part of the paragraph,"—put, and *agreed to* :—

Amendments made :—Paragraph, as amended, *agreed to*.

Paragraph 106, *agreed to*.

Paragraph 107, *postponed*.

Paragraphs 108—109, *agreed to*.

[Adjourned till Thursday next, at Half-past Twelve o'clock.

Thursday, 27*th June* 1879.

MEMBERS PRESENT :

Lord GEORGE HAMILTON in the Chair.

Sir George Campbell.	Mr. Grant Duff.
Mr. Onslow.	Mr. Mulholland.
Mr. Sampson Lloyd.	Mr. Ashbury.
Mr. John Cross.	Mr. Fawcett.
Sir Joseph M'Kenna.	Mr. Agnew.
Mr. Ernest Noel.	Mr. Hardcastle.
Mr. Edward Stanhope.	Mr. Balfour.
Mr. Childers.	

Paragraphs 110—112, amended, and *agreed to*.

Paragraph 113.—Amendment proposed, in line 1, to leave out from the word "clear" to the end of the paragraph—(Sir *George Campbell*) :—

Question put, That the words proposed to be left out stand part of the paragraph.—The Committee divided :

Ayes, 12.	Noes, 2.
Mr. Grant Duff.	Sir George Campbell.
Mr. Agnew.	Sir Joseph M'Kenna.
Mr. Mulholland.	
Mr. Ernest Noel.	
Mr. Edward Stanhope.	
Mr. Childers.	
Mr. Fawcett.	
Mr. Onslow.	
Mr. Sampson Lloyd.	
Mr. John Cross.	
Mr. Ashbury.	
Mr. Hardcastle.	

Paragraph *agreed to*.

Paragraphs 114—116, amended, and *agreed to*.

Paragraph

Paragraph 117.—Amendment proposed in line 1, to leave out from the word "India" to the word "country," in line 4—(Mr. *Onslow*):—

Question put, That the words "where there is little or no publicity" stand part of the paragraph.—The Committee divided:

Ayes, 9.	Noes, 5.
Mr. Mulholland.	Mr. Grant Duff.
Mr. Edward Stanhope.	Mr. Agnew.
Mr. Childers.	Mr. Ernest Noel.
Mr. Fawcett.	Sir George Campbell.
Mr. John Cross.	Mr. Onslow.
Sir Joseph M'Kenna.	
Mr. Ashbury.	
Mr. Hardcastle.	
Mr. Balfour.	

Amendment made.—Another Amendment proposed, in line 8, to leave out the words "under existing rules"—(Sir *George Campbell*):—

Question put, That the words proposed to be left out stand part of the paragraph.—The Committee divided:

Ayes, 11.	Noes, 2.
Mr. Agnew.	Sir George Campbell.
Mr. Mulholland.	Mr. Grant Duff.
Mr. Ernest Noel.	
Mr. Edward Stanhope.	
Mr. Childers.	
Mr. Fawcett.	
Mr. Onslow.	
Mr. John Cross.	
Mr. Ashbury.	
Mr. Hardcastle.	
Mr. Balfour.	

Paragraph, as amended, *agreed to.*

Paragraphs 118—121, *agreed to.*

Paragraphs 122—125, amended, and *agreed to.*

Paragraph 126.—Amendment proposed, to omit the paragraph, in order to insert the following new paragraph:—"Your Committee see great objection to this proposal in the permanent charge upon the revenues of India which it involves, whereas their hope would be (and that hope is justified by the figures stated in this Report), that as the railway and other works undertaken become more and more productive, and fresh works are more carefully scrutinised than they have hitherto been, the net charge upon the revenues of India may be diminished"—(Sir *George Campbell*)—instead thereof:—

Question, That paragraph 126 stand part of the proposed Report,—put, and *agreed to.*

Paragraphs 127 and 128, *agreed to.*

Paragraph 129.—Amendment proposed, in line 4, to leave out from the word "done," to the end of the paragraph, in order to add the words, "your Committee doubt, therefore, the prudence and safety of relying only on the limit of net loss proposed by the Government of India, and think that more reliance must be placed on a careful and thorough scrutiny of the plans and estimates, and especially on a strict enforcement of the principle of local responsibility"—(Sir *George Campbell*)—instead thereof:—

Question, That the words proposed to be left out stand part of the paragraph,—put, and *agreed to*:—

Question put, "That the paragraph stand part of the proposed Report."—The Committee divided:

Ayes, 7.	Noes, 4.
Mr. Agnew.	Sir George Campbell.
Mr. Mulholland.	Mr. Sampson Lloyd.
Mr. Edward Stanhope.	Mr. John Cross.
Mr. Childers.	Sir Joseph M'Kenna.
Mr. Fawcett.	
Mr. Onslow.	
Mr. Balfour.	

Paragraph 130.—Amendment proposed, to omit the paragraph, in order to insert the following new paragraph:—"With a view to check the expenditure in the way re-

commended by your Committee, they consider that the works to be undertaken directly by the Government of India should be limited as much as possible, being strictly confined to those which are of an inter-provincial character. It would probably not be difficult to mark out the lines of railway or the deltaic canals which are still required to link different provinces together, to connect the interior with the seaports, or to facilitate communication between the most over-peopled provinces and those where population is required to develope nascent industries. The tracts where climatic conditions render the extension of irrigation works on a very large scale a very immediate question are now very limited. It is doubtful whether there is immediate necessity to undertake great new harbours or other works of an Imperial character. For the rest, your Committee are of opinion that all further extension of the system of borrowing for public works, including all branch and local railways, provincial and local canals and harbours, and other similar works, should be confined to those cases in which the projects are recommended by the local and provincial administrations concerned, and in which a financial guarantee is offered, independent of the annual grants made by the Government of India to the provincial administrations. Such projects should be very carefully scrutinised and checked by the Government of India, and should not be undertaken unless there is a complete concurrence of the local and central authorities in regard to both the material feasibility and the financial prudence of the scheme:"

—(Sir *George Campbell*)—instead thereof:—

Question put, That paragraph 130 stand part of the proposed Report.—The Committee divided:

Ayes, 8.	Noes, 2.
Mr. Agnew.	Sir George Campbell.
Mr. Edward Stanhope.	Mr. Mulholland.
Mr. Childers.	
Mr. Fawcett.	
Mr. Onslow.	
Mr. John Cross.	
Mr. Hardcastle.	
Mr. Balfour.	

[Adjourned till Thursday, 10th July, at Half-past Twelve o'clock.

Thursday, 10*th July* 1879.

MEMBERS PRESENT:

Lord GEORGE HAMILTON in the Chair.

Mr. Edward Stanhope.	Mr. Childers.
Mr. Ashbury.	Mr. Fawcett.
Sir George Campbell.	Mr. Balfour.
Mr. Onslow.	Mr. Hardcastle.
Mr. Sampson Lloyd.	Mr. Grant Duff.
Mr. Agnew.	

Postponed paragraph 60, amended, and *agreed to.*

Postponed paragraphs 62—64, *disagreed to.*

Paragraph 131.—Amendments made.—Amendment proposed, after the last Amendment, to insert the words, "and should, for the present, be limited to an amount of 2,500,000 *l.*, as recently fixed by the Secretary of State for India in Council"—(The *Chairman*):—

Question put, That those words be there inserted.—The Committee divided:

Ayes, 5.	Noes, 5.
Mr. Edward Stanhope.	Mr. Agnew.
Mr. Balfour.	Sir George Campbell.
Mr. Ashbury.	Mr. Onslow.
Mr. Childers.	Mr. Sampson Lloyd.
Mr. Fawcett.	Mr. Hardcastle.

Whereupon the Chairman declared himself with the *Ayes.*

Other Amendments made.—Paragraph, as amended, *agreed to.*

Amendment

Amendment proposed to insert the following new paragraph:—" Your Committee while putting forward the above recommendations do not in any way wish to preclude the Secretary of State from sanctioning any proposal for the construction of works out of any monies raised by loan, which, in his opinion, are necessary for the better protection of India"—(Mr. *Onslow*):—

Question put, That this paragraph be inserted in the proposed Report :—The Committee divided:

Aye, 1.	Noes, 10.
Mr. Onslow.	Mr. Agnew. Mr. Edward Stanhope. Mr. Balfour. Mr. Ashbury. Sir George Campbell. Mr. Childers. Mr. Fawcett. Mr. Sampson Lloyd. Mr. Hardcastle. Mr. Grant Duff.

Paragraphs 132—134, *agreed to.*

A new paragraph—(The *Chairman*)—added.

Paragraph 135, *disagreed to.*

[Adjourned till Thursday, 24th July, at Half-past Twelve o'clock.

Thursday, 24th July 1879.

MEMBERS PRESENT:

Mr. EDWARD STANHOPE in the Chair.

Mr. Childers. Sir George Campbell. Mr. Fawcett. Mr. Agnew.	Mr. Hardcastle. Mr. Balfour. Sir Joseph M'Kenna.

Postponed Paragraphs 101—102, *agreed to.*

Postponed Paragraph 107, amended, and *agreed to.*

A new Paragraph—(Mr. *Edward Stanhope*)—added.

Amendment proposed to insert the following new paragraph: " Your Committee, while making allowance for these difficulties, are clearly of opinion that loans for Public Works in India should always be raised in India, unless the Secretary of State should be satisfied that the difference between the rates of interest in England and India is so considerable as to afford full compensation for the disadvantages which inevitably attend borrowing in this country. They concur, therefore, in the communication of the Secretary of State to the Viceroy, in which he requests that, whenever it is possible, a certain portion of the Famine Insurance Fund should be remitted to this country, and applied to reducing the debt raised in London for famine expenditure "—(Mr. *Edward Stanhope*):—

Question proposed, That this paragraph be inserted in the proposed Report.

Amendment proposed, to leave out from the words " your Committee," in line 1, to " country," in line 5, in order to insert the words " observe that there is a practical limit to the expenditure in consequence of the objections to going too largely into the market to raise loans. In India the borrowing power of the Government is certainly limited if operations be confined to money really found in India. On the other hand, if loans which are nominally raised in India are really supplied by English capitalists, who find the money for the purpose, the indebtedness of India to England and the amount to be annually remitted, is increased just as much as if the money were directly raised in England, or more so; the variations of exchange apart. The loss occasioned by the recent change in the relative value of gold and silver has created a feeling of uneasiness on this subject ; and the political effect of too largely increasing the remittances which India is bound annually to make to England might be disadvantageous. Still it is evident that in these respects the effect would be nearly the same if money were invested by private capitalists on works in India; and it could hardly be thought desirable that India should be the only country in the world debarred for drawing for its development upon the great central reservoir of capital in England. It may be argued that if by investment of English capital the

productions of India are increased, and the increase in the export of Indian produce equals, or exceeds, the increased demand for remittances, the difficulties apprehended are avoided. On the whole, your Committee are of opinion that while India cannot be altogether shut out from the London money market, for political and other reasons, it is most desirable that any loans which the Government may find it desirable to raise should be obtained from the people of India, so far as is possible, without a great pecuniary sacrifice.

"Your Committee understand that of late years loans have been raised in India in such a way that in practice they are confined to great capitalists, who profit largely by the transaction; and of these subscriptions a large proportion really comes from the bankers at the presidency towns, and largely represents English capital; the result being that the Government pays very much dearer than if the money was borrowed in England, without obtaining the political advantages desired. Your Committee are of opinion that if money is to be continually borrowed for public works it would be well to revert to the system prevailing in former days, and to give the utmost facility to natives in the interior of the country to subscribe from time to time at their convenience. The political security thus gained would be well worth that greater costliness of the loans, for which there is no adequate return when the difference is absorbed to the profit of the European bankers.

"Only after having tried to the utmost this appeal to the native community would it be desirable to borrow English money. But in so far as money must be borrowed and cannot be obtained from India, your Committee do not see that the Indian Government can be debarred from the English money market. The only question would be whether the obligation should be incurred in gold or silver, and that is a question upon which your Committee do not feel called on to enter.

"Your Committee can, in brief, only recommend that when money is borrowed every effort should be made to obtain Indian money, and that, only failing that, resort should be had to English money"—(Sir *George Campbell*)—instead thereof.

Question, That the words proposed to be left out stand part of the proposed new paragraph,—put, and *agreed to.*

Amendments made.—Paragraph, as amended, inserted in the proposed Report.

Another new paragraph—(Mr. *Edward Stanhope*)—inserted.

Paragraphs 136—138, amended, and *agreed to.*

Paragraph 139, *disagreed to.*

Another new paragraph—(Sir *George Campbell*)—inserted.

Paragraph 140, *disagreed to.*

Paragraph 141, amended, and *agreed to.*

Paragraph 142, *agreed to.*

Paragraph 143, amended, and *agreed to.*

Ordered, To Report, together with the Minutes of Evidence and an Appendix.

EXPENSES OF WITNESS.

NAME OF WITNESS.	Profession or Condition.	From whence Summoned.	Number of Days Absent from Home, under Orders of Committee.	Allowance during Absence from Home.	Expenses of Journey to London and back.	TOTAL Expenses allowed to Witness.
				£. s. d.	£. s. d.	£. s. d.
W. Sowerby - -	Civil Engineer -	- - -	Two - -	6 6 -	- -	6 6 -

REPORT

FROM THE

SELECT COMMITTEE

ON

EAST INDIA (PUBLIC WORKS);

WITH THE

PROCEEDINGS OF THE COMMITTEE.

Ordered, by The House of Commons, *to be Printed*,
24 *July* 1879.

[*Price 7 d.*]

312.

Under 6 *oz.*

REPORT

FROM THE

SELECT COMMITTEE

ON

EAST INDIA (PUBLIC WORKS);

TOGETHER WITH THE

PROCEEDINGS OF THE COMMITTEE,

MINUTES OF EVIDENCE,

AND APPENDIX.

Ordered, by The House of Commons, *to be Printed,*
24 *July* 1879.

312.

Ordered,—[*Wednesday*, 19*th February* 1879]:—THAT a Select Committee be appointed to inquire into and report as to the expediency of constructing Public Works in India with money raised on loan, both as regards financial results and the prevention of famine.

THAT the Committee do consist of Seventeen Members.

Committee nominated of—

Lord George Hamilton.	Mr. Hardcastle.
Mr. Fawcett.	Sir Joseph M'Kenna.
Mr. Balfour.	Mr. Sampson Lloyd.
Mr. Childers.	Mr. Grant Duff.
Mr. Ashbury.	Mr. Mulholland.
Sir George Campbell.	Mr. Ernest Noel.
Mr. Onslow.	Mr. Agnew.
Mr. John Cross.	Mr. Edward Stanhope.
Mr. Pease.	

THAT the Committee have power to send for Persons, Papers, and Records.

THAT Five be the Quorum of the Committee.

Ordered,—[*Thursday*, 20*th February* 1879]:—THAT the Minutes of Evidence taken before the Select Committee on East India (Public Works), in the last Session of Parliament, be referred to the Committee.

REPORT - - - - - - - - - - - - - - p. iii

PROCEEDINGS OF THE COMMITTEE - - - - - p. xxiv

MINUTES OF EVIDENCE - - - - - - - - - p. 1

APPENDIX - - - - - - - - - - - - - p. 67

REPORT.

THE SELECT COMMITTEE appointed to Inquire into and Report as to the Expediency of Constructing PUBLIC WORKS in INDIA with Money raised on LOAN, both as regards Financial Results and the Prevention of Famine;——HAVE agreed to the following REPORT:—

INDIAN PUBLIC WORKS.

YOUR Committee have throughout their inquiry kept carefully in view the limits of the reference made to them, and they have not considered it desirable to prolong their proceedings by taking evidence upon other branches of Indian Finance, except so far as was necessary to enable them to arrive at definite conclusions upon the specific subject referred to them for investigation.

The expenditure connected with Public Works in India, from money raised on loan, differs from the other annual disbursements made by that Government and included in the annual revenue and expenditure accounts presented to Parliament, inasmuch as it is an annual investment deliberately made by borrowing in order to produce certain results.

The information therefore obtained by your Committee, and the suggestions which they consequently are prepared to make, may be conveniently divided into three heads:

1. The origin and growth of the present system of constructing on loan public works in India.

2. Results of that system so far as they can be ascertained.

3. The alterations and safeguards which, considering the condition of Indian finance, are in the opinion of your Committee necessary to secure the prosecution of reproductive public works upon a safe and intelligible basis.

THE ORIGIN OF THE PUBLIC WORKS DEPARTMENT.

Previous to 1854 public works of all description were carried on by the engineer department of the army, under the superintendence of a military board in each of the three Presidencies. If the work required to be done was civil, engineers were lent to the Civil Department, or else the works were undertaken by the military board. The financial control exercised depended upon the nature of the undertaking; if military, the Military Department were responsible; if civil, a civil department of the Government of India, or the local government within whose jurisdiction the work was carried out. Under this system the principal works for the development of the country, constructed directly by the Government of India before 1854, were portions of the Jumna and Ganges Canals, certain irrigation works in the deltas of Madras, and the Great Trunk Road to the North. All expenditure incurred under this system was treated as ordinary expenditure, and charged against the revenue of the year.

In 1854 Lord Dalhousie abolished the military boards, substituting in their place a chief engineer under each of the local governments, and at the same

time forming a Central Public Works Secretariat at Calcutta for the general supervision of the local establishment, and out of the organisation thus instituted has been gradually developed the present Public Works Department.

The works to be executed and the expenditure to be controlled by this Department naturally divide themselves into two different heads:—

1st. Those relating to the maintenance and erection of civil and military buildings, the repair and construction of roads and the other multifarious works necessary for the smooth and effective working, of the administration of a great empire.

2nd. The construction and extension of works of public utility, such as railways, irrigation canals and harbours, which although not absolutely necessary for purposes of administration, were calculated to increase the wealth, and promote the prosperity, of the country.

The cost of the first-named works had from the first, with one exception hereafter to be noted, been charged as ordinary expenditure against the revenue of the year, whilst those in the latter category have almost all virtually been made with borrowed money, though the agency by which they have been constructed and the methods of borrowing have greatly varied.

As the investigations of your Committee have been mainly confined to the works constructed with money raised on loan, they do not consider it necessary to enumerate, from the formation of the Public Works Department to the present time, all the various alterations made in it by successive Viceroys. As its wants grew and its expenditure increased, the Department expanded into separate divisions, comprising at the present moment a military works branch, a civil buildings and roads branch, an irrigation branch, and a railway branch. It would also be beyond the province of their inquiry if the Committee were to trace the process of that portion of the policy of decentralisation commenced by Lord Mayo, by which a large and increasing portion of the expenditure connected with civil building works and roads was transferred to the control of the various local governments, inasmuch as the cost of these classes of works are defrayed from the revenue of the year.

A very large expenditure has been incurred during the last 20 years by the erection of barracks, in order to provide for the accommodation of the additional European forces stationed in India subsequent to the mutiny of 1857. This outlay was, in the opinion of the Indian Government, so necessary and pressing, that in 1865 and 1866 they requested leave to include it within the category of public works, the cost of which might legitimately be defrayed by loans. Although sanction was at one time given by the Secretary of State in Council to the request, yet it was so soon afterwards withdrawn and rescinded, that your Committee merely notice the transaction in order to express their strong opinion that all disbursements of this character should be included in the ordinary expenditure, and met by the ordinary revenue of the year.

The only undertakings, therefore, with the exception of a few harbour works constructed for the enlargement of the great seaports of India, which have continuously been constructed out of loans, with the sanction both of the Home and Indian Government, are railways and irrigation works. A short account of the policy pursued in reference to each class of work will best illustrate what has been done, and with what result.

Railways.

One of the undoubted objects of Lord Dalhousie in substituting new machinery for the constructing of public works was to provide for an augmentation of the expenditure upon works of public utility. In regard to railways, he proposed a system under which they would be constructed with a guarantee from the Government of India of 5 per cent. on the capital raised, their operations within certain limits being under the control of the Government. His proposals, with certain modifications, were finally adopted, and from 1846 to 1867, all railways, with very minor exceptions constructed in India were made through the agency of guaranteed companies.

This policy, although it led to the rapid and continuous application of capital to railway extension in India, was not considered conducive to economy either

either in the execution of the work or in the working of the lines, and the Indian Government finding it difficult to obtain the consent of companies to the alterations in the contracts necessary in their opinion to insure proper control and economy, determined to discard indirect agency, and undertake the works and the working of future lines themselves.

A full and detailed statement of the reasons prompting the Government of India to take upon themselves this additional responsibility, will be found in a Minute in the Appendix, written by Lord Lawrence, and dated the 9th January 1869. From that time no fresh contracts, except for small extensions of existing lines, have been entered into with guaranteed companies, and the Indian Government have themselves raised the money and executed the works.

The total amount raised by the guaranteed companies up to 31st March 1878, was 95,420,309 *l.*, and the sums expended by the State, were 18,636,321 *l.*, making a total of 114,056,630 *l.*

This expenditure has given to India, up to April 1878, 7,552 miles of railway, of which 5,913 miles are constructed on a gauge of 5 ft. 6 in., 1,639 miles on a gauge of 3 ft. 3 in. Mr. Danvers' Report, 1878.

Although the railway system of India is by no means complete, yet it already connects Bombay, Madras, and Calcutta, and, by passing through the great plains, places railway communication within reach of almost all the great towns of the country. It may therefore fairly be said that the great trunk lines originally designed have been almost completed.

The following Table gives the annual rate at which this railway outlay has been incurred, from the year 1845–46 to 1877–78.

YEAR.	Guaranteed Railways.	State Railways.	TOTAL.	YEAR.	Guaranteed Railways.	State Railways.	TOTAL.
	£.	£.	£.		£.	£.	£.
1845–46 - -	—	—	—	1863–64 - -	4,755,653	—	4,755,653
1846–47 - -	—	—	—	1864–65 - -	4,122,240	—	4,122,240
1847–48 - -	—	—	—	1865–66 - -	5,636,866	—	5,636,866
1848–49 - -	—	—	—	1866–67 - -	7,297,703	—	7,297,703
1849–50 - -	75,893	—	75,893	1867–68 - -	7,120,081	594	7,120,675
1850–51 - -	99,263	—	99,263	1868–69 - -	3,867,927	552,398	4,420,325
1851–52 - -	351,323	—	351,323	1869–70 - -	4,742,851	190,870	4,933,721
1852–53 - -	427,560	—	427,560	1870–71 - -	3,776,270	449,372	4,225,642
1853–54 - -	670,649	—	670,649	1871–72 - -	2,496,728	644,620	3,141,348
1854–55 - -	1,730,156	—	1,730,156	1872–73 - -	477,245	1,413,649	1,890,894
1855–56 - -	3,366,411	—	3,366,411	1873–74 - -	693,053	2,354,625	3,047,678
1856–57 - -	3,515,100	—	3,515,100	1874–75 - -	1,087,911	3,014,180	4,102,091
1857–58 - -	3,423,068	—	3,423,068	1875–76 - -	950,806	3,165,184	4,115,990
1858–59 - -	5,492,108	—	5,492,108	1876–77 - -	715,459	2,865,861	3,581,320
1859–60 - -	7,171,464	—	7,171,464	1877–78 - -	1,312,250	3,984,968	5,297,218
1860–61 - -	7,578,715	—	7,578,715	£.	95,420,309	18,636,321	114,056,630
1861–62 - -	6,602,212	—	6,602,212				
1862–63 - -	5,863,344	—	5,863,344				

The capital expenditure of the guaranteed companies was not shown in the Revenue and Expenditure Accounts presented annually to Parliament, the only charges in connection with their outlay being the amount annually debited against the revenue of the year, to make good the difference between the interest guaranteed, and the net receipts received by the Government, and the cost of supervision and of land provided for the lines.

When, however, the State undertook the construction of railways, the capital annually so expended was classed as Extraordinary Expenditure, but though placed outside the ordinary expenditure, was charged against the revenue on the understanding that, if the revenue was unable to meet this charge, the funds might be obtained by borrowing. Your Committee propose to treat all such Expenditure as borrowed money, it being obvious that any surplus,

which but for this charge would have been shown in the ordinary account of a particular year, might have been applied to the reduction of existing liabilities, a separation of the capital account, either of railways or of irrigation works, into two portions, one bearing and the other not bearing interest, would make the real cost or profit of such works to the State a matter almost beyond the possibility of calculation.

Irrigation.

The uncertainty and great variation of the annual rainfall renders cultivation in many parts of India precarious and fruitless without the storage and distribution of water, and to meet this ever recurring difficulty irrigation works of all sizes and methods have for centuries past been in existence in these districts. Many of these beneficent works were destroyed by the internecine wars preceding the establishment of British rule, whilst the number and utility of those left was much diminished by want of repairs, disuse, and decay. It is impossible to estimate what the value, in a pecuniary sense, was of the works so transferred or left to the British Government by the Native rulers. Certain sums were from time to time, previous to the establishment of the Public Works Department, expended in their repair and extensions; but this expenditure was comparatively small.

Lord Dalhousie was desirous of annually expending a certain sum raised on loan in promoting irrigation, and in establishing the Public Works Department he designated a sum not exceeding two millions sterling to be annually so applied. His retirement and the outbreak of the Indian Mutiny postponed the carrying out of these proposals.

In 1858, great pressure being brought upon the Government of India to promote irrigation by the same indirect agency as that by which they were then extending railway communication, the Madras Irrigation Company was formed, with a Government guarantee of 5 per cent. upon a capital of 1,000,000 *l.*, and a few years after another private company undertook, without a guarantee, the construction of a system of irrigation canals in Orissa. Both these experiments have proved costly failures to the State. The arrangements between the Secretary of State in Council and the Orissa Company soon became so involved that it was considered advisable to terminate them by the purchase of the works of the Company at a price much above their market value. This sale was effected at a time when the Company was practically bankrupt. The Madras Irrigation Company since its formation has succeeded for one year only in meeting its working expenses. The Secretary of State has, in addition to the guaranteed rate, advanced, free of interest, 600,000 *l.* to the directors of this company, of which 228,000 *l.* has been repaid; 1,372,000 *l.* has, therefore, been swallowed up by this undertaking, without any return whatever to the State.

Warned by these fiascos of private enterprise, the Government of India determined to construct themselves all irrigation works for the future. This decision was arrived at in 1867, and from that time all expenditure upon the extension of irrigation works expected to be remunerative, has been, together with that upon State railways, termed extraordinary, and the money required has been obtained by borrowing.

Treating all irrigation expenditure as money raised on loan, we find that the total expenditure up to 1876-77, was 17,635,779 *l.*

	State.	Madras Irrigation and Canal Company.	Total.
	£.	£.	£.
Up to 1866–67 inclusive - - - -	6,612,495	964,833	7,577,328
1867–68 to 1876–77 - - - - -	9,651,618	406,833	10,058,451
Total - - - £.	16,264,113	1,371,666	17,635,779

The expenditure upon irrigation extension may therefore be said to have passed through three phases, first, for the period from the establishment of our rule to 1854, when the annual disbursements were comparatively small, and met from revenue; secondly, from 1854 to 1867, during which time the experiment of private companies was tried in addition; thirdly, from 1867, the

the date of the extraordinary public works policy, under which all irrigation works were undertaken by the State, and a sum from one to two millions sterling was devoted annually to their prosecution.

The existing establishment of the Public Works Department being supposed to be inadequate to the new demands thus imposed on it, in 1870 an engineering college was established in England for the supply of highly trained engineer officers, and in 1874 a new member was added to the Viceroy's Council, to personally superintend the policy and control the expenditure of the department to which the construction of railways and canals in India was to be solely entrusted.

For these purposes, in 1873, the Government of India sent home a forecast as to the probable results of a proposed annual expenditure for the next five years of four millions and a-half sterling, three millions to be devoted to railways, one and a-half to irrigation.

In 1875 a revised forecast was received, in which the proposed expenditure was reduced to four millions annually; 2,700,000 *l.* for railways, the remainder for irrigation ; the actual expenditure for the last three years has been, in —

1876-77	£. 4,031,320
1877-78	4,638,035
1878-79	4,551,000

Details of this outlay will be found in the Appendix.

The policy embodied in this increased outlay was originally justified on the assumption that the works comprised in the category of, and sanctioned as, Public Works Extraordinary, would, with few exceptions, prove remunerative, that is, that the direct receipts from them would more than meet the interest of the sums expended on their construction, plus their working expenses. How far this assumption has been realised will be seen when your Committee consider that portion of their inquiry relating to —

> The *results* financial, and otherwise, of the railways and irrigation works already *constructed or sanctioned.*

RESULTS.

RAILWAYS.

The direct annual gain or loss to the State from railway outlay since 1858, is as follows:—

YEAR.	GUARANTEED RAILWAYS.					STATE RAILWAYS.				TOTAL
	Capital Raised to end of each Year.	Capital withdrawn for Expenditure to end of each Year.	Net Traffic Receipts, less Moieties of Surplus Profits Repaid to Companies.	Guaranteed Interest.	Loss or *Gain* to State.	Capital Expended.	Net Traffic Receipts.	Interest at 4¼ per Cent.	Loss or *Gain* to State.	Loss or *Gain* to State.
	£.	£.	£.	£.	£.	£.	£.	£.	£.	£.
1858-59	22,998,405	19,151,531	232,365	838,411	606,046	- -	-	- -	- -	606,046
1859-60	28,573,287	26,322,995	403,057	1,199,929	796,872	- -	-	- -	- -	796,872
1860-61	34,397,817	33,901,710	389,413	1,485,745	1,096,332	- -	-	- -	- -	1,096,332
1861-62	42,979,539	40,503,922	391,162	1,788,153	1,396,991	- -	-	- -	- -	1,396,991
1862-63	48,218,541	46,367,266	625,615	2,166,755	1,541,140	- -	-	- -	- -	1,541,140
1863-64	54,332,994	51,122,919	821,548	2,456,182	1,634,634	- -	-	- -	- -	1,634,634
1864-65	57,541,917	55,245,159	1,129,851	2,683,787	1,553,936	- -	-	- -	- -	1,553,936
1865-66	60,860,247	60,882,025	2,865,574	2,889,241	23,667	- -	-	- -	- -	23,667
1866-67	67,258,917	68,179,728	2,347,085	3,031,087	684,002	- -	-	- -	- -	684,002
1867-68	76,571,751	75,299,809	1,989,112	3,480,677	1,491,565	594	-	14	14	1,491,579
1868-69	82,417,905	79,167,736	2,229,509	3,881,013	1,651,504	552,992	*1,379*	12,455	13,834	1,665,338
1869-70	86,773,325	83,910,587	2,627,941	4,126,025	1,498,084	743,862	*790*	29,180	29,970	1,528,054
1870-71	91,426,816	87,686,857	2,556,707	4,341,609	1,784,902	1,193,234	68	43,585	43,517	1,828,419
1871-72	93,550,303	90,183,585	2,877,153	4,542,183	1,665,030	1,837,854	*4,063*	68,199	72,262	1,737,292
1872-73	93,736,915	90,660,830	2,554,485	4,608,418	2,053,933	3,251,503	5,362	114,510	109,148	2,163,081
1873-74	94,725,814	91,353,883	3,241,189	4,617,923	1,376,734	5,606,128	*6,474*	199,297	205,771	1,582,505
1874-75	95,119,118	92,441,794	3,454,848	4,643,901	1,189,053	8,620,308	44,982	320,095	275,113	1,464,166
1875-76	95,072,441	93,392,600	3,729,034	4,637,891	908,857	11,785,492	96,027	459,131	363,104	1,271,961
1876-77	94,833,129	94,108,059	4,433,151	4,658,681	225,530	14,651,353	88,621	*587,525	498,904	724,434
1877-78	96,313,173	95,420,309	5,396,790	4,655,285	*741,505*+	18,636,321	127,774	*737,479	609,705	*131,800*+
		£.	44,295,589	66,732,896	22,437,307	£.	350,128	2,571,470	2,221,342	24,658,649

* These amounts are taken from the Finance and Revenue Accounts. The other sums in this column are estimated.

No accurate comparison as to the financial results of the two different systems of railway construction can be drawn from the above Table. The continuous annual application of capital to any particular object must always leave that portion of the outlay expended in works, not yet in operation, unproductive. So long as the guaranteed system was in force, a certain proportion of the capital of the companies thus remained unproductive. When the indirect agency was abolished and State construction substituted, the amount of work remaining to be finished by the Companies, and the capital necessary for its completion, annually diminished, until the whole of their capital may now be said to be bearing some return. On the other hand, a very large proportion of the State expenditure is locked up in railways not yet completed. Your Committee have, therefore, combined the results derived from both systems.

The above Table shows that this railway expenditure has not been financially remunerative, for in every year except 1877-78 the State has been obliged to furnish a considerable sum to meet the difference between the net reeceipts and the interest due on the capital raised.

If this annual loss on the railway expenditure had not been met out of the general revenues of India, but had been yearly added to the capital actually expended, the financial results would have been still more unsatisfactory. On the other hands, these calculations make no allowance for any of the indirect benefits directly traceable to railway communication, such as enhancement of the value of land, the opening of new markets, the impetus given to the export trade, the reduction in military establishments from greater power of transport and concentration, and the many other benefits derived from rapid and easy inter-communication in a territory of the enormous area of India.

Without in any way ignoring these collateral gains, it must be remembered, that originally the policy of guaranteeing interest on capital expended in the construction of public works was promoted on the ground, not that the indirect benefits would be a sufficient compensation for the direct financial loss, but that in all probability the State would have the benefit of a remunerative return, in addition to indirect advantages.

It should, however, be observed that since 1873-4 (without including the year 1877-8, in which the receipts were enormously augmented by traffic due to famine) the net revenue, that is to say, the difference between the gross receipts and the working expenses of the guaranteed railways has steadily increased, a result which cannot be considered unsatisfactory.

IRRIGATION.

The returns derived from irrigation works which have in part or wholly been made by borrowed money are somewhat complex, and at present incomplete.

No estimate has been, or can be, given of the pecuniary value of the old native works to which additions have been made by the Public Works Department. For instance, the capital expenditure on one of the Madras works, upon which a very large return is claimed, does not include the value of the old work upon which the British undertaking was founded more recently.

The revenue derived from irrigation is termed direct and indirect. By direct receipts is meant the water-rate paid for the use of the water; by indirect, the enhanced value of the land due to the vicinity of the canal or tank. As, however, the systems of land tenure and assessment differ, so the method of payment for the use of the water varies. In the Bengal Presidency that portion of the land revenue claimed as due to irrigation is annually included in the returns presented by the Accountant of the Public Works Department.

In Madras and Bombay, where a different form of land settlement has been established, some difficulty has been experienced in separating the payment for water from that for the use of the land; so much so that the only return your Committee have been able to obtain, through General Dickens' investigation, is not complete as regards the receipts from certain of the Madras works, whilst to none of the works in Bombay proper is any indirect revenue credited. The Scinde returns are, however, complete.

This

This statement (which will be found page 422 of the Appendix) is compiled in accordance with the instructions sent to the Government of India by the Secretary of State in Council, by which, for the first time, an attempt was made to present annually to Parliament, in a concise shape, the actual financial result of the irrigation expenditure. Previous to that time all the interest due on money raised on loan and sunk in irrigation works was included in the interest payable on the general debt, and was not shown in a separate statement, the working expenses were included under the head of Public Works Ordinary, whilst on the revenue side the whole indirect receipts were returned as part of the land revenue, the only sums credited to irrigation being the direct payments made in the shape of water rates.

This form of account was very unsatisfactory, and so long as it was continued it was difficult even for officers of the Public Works or Financial Departments to ascertain the exact annual financial results of the expenditure, whilst the task was wholly beyond the means either of individual members of your House or of the general public.

The following statement of the capital and revenue of the irrigation works for the year 1875-76 has been furnished by General Dickens, with the assistance of the Financial Department of the India Office. No allowance is, however, made in this return for the value of the old native works.

Total Expenditure.	Total Receipts.	Working Expenses.	Interest 4½ per Cent.	Excess; Revenue.
£.	£.	£.	£.	£.
15,562,655	1,228,993	396,750	700,319	131,924

This return is, at first sight, satisfactory; but a further analysis is necessary before your Committee can make clear the probable result of a continuation of the present irrigation expenditure.

Taking the local provinces separately, the following Table shows the great variation in results:—

———	Capital Expenditure.	Total Receipts.	Working Expenses.	Interest.	Excess or Deficiency.
	£.	£.	£.	£.	£.
Bengal - - -	4,072,742	23,043	52,949	183,237	— 213,179
North West Provinces -	4,939,527	375,659	145,015	222,279	+ 8,465
Punjaub - - -	3,335,503	288,360	136,214	150,097	+ 2,049
Scinde - - -	667,704	161,368	- -	30,047	+ 132,103
Bombay - - -	665,938	4,090	- -	29,967	— 25,877
Madras - - -	1,881,241	376,473	62,572	84,656	+ 229,245

This classification brings out in strong contrast the use made of the works by the inhabitants of different provinces; Scinde irrigation, according to the above figures, giving a return of 19·66 per cent. on a capital of 667,704 *l.*; Bengal, a loss of 5·23, on a capital of 4,072,742 *l.* The Madras return does not include the Madras Irrigation Company.

If from the sum total receipts of the above works the revenue due to certain works is deducted, a remarkable fluctuation is again shown. The main irrigation revenue of the Punjaub and North West Provinces is derived from the Ganges and Jumna canals, and in Madras the Cauvery, Kristnah, and Godavery works supply the whole revenue, the remaining works showing an excess of expenditure. In Scinde all the irrigation works, with a single exception,

tion, are remunerative. Classifying the works as below, we get the following remarkable results:—

	Capital.	Receipts after meeting Working Expenses, and Interest at 4½.	Excess Revenue Per Cent.
	£.	£.	£.
Scinde Irrigation Works - - - - -	667,704	132,103	19·66
Ganges - - - - - - - - -	2,826,479	42,808	1·51
East Jumna - - - - - - - -	231,743	47,946	20·68
West Jumna - - - - - - - -	432,764	84,010	19·42
Cauvery - - - - - - - -	116,072	108,923	81·30
Godavery - - - - - - - -	736,444	94,351	12·94
Kristna - - - - - - - - -	468,590	45,630	9·8
£.	5,474,796	555,771	
The remaining works, including - - -	10,197,869	— 421,859	
The Madras Irrigation Company - - -	1,372,000	— 46,453	
£.	11,569,869	— 488,312	

This very great variation is due, in the opinion of your Committee, not to accident or engineering mistakes; on the contrary, the general causes of failure and success can be so easily traced, and are so intimately connected with the second part of the investigation, the effect of these works in preventing or mitigating famine, that both should be considered together.

Cause of famine.

The various famines which during the last century have devastated different parts of India have all mainly, if not entirely, arisen from drought.

It is therefore too frequently assumed that as want of rain is the primary cause of failure of crops, the prevention of famine could be easily and profitably accomplished by the State undertaking, in all parts of India, works for the storage and distribution of water, whose utility would be so readily recognised by the population in their vicinity, as to render their construction remunerative to their promoters and reproductive to the locality.

These wholesale assumptions altogether ignore the enormous area of India, the difference between the physical conformation, soils, crops, and climate of its various provinces, and above all the very great variation in the rainfall.

Sir George Campbell (a Member of your Committee), in his evidence, gave a detailed account of the rain supply of India, as well as of the course and ordinary movement of the monsoons supplying that rainfall. A map published in the 1872–73 Statement of the Moral and Material Progress of India, so well illustrates his observations, that your Committee have deemed it advisable to append one containing the latest information on the subject.

Upper India.

The great plains of India, north of the Vindhya Mountains, may be divided for meteorological purposes into the tracts traversed by the Indus and other rivers passing through the Punjaub to the Arabian Sea, and those watered by the Ganges and Jumna on their way to the Bay of Bengal.

The greater part of the south-western portion of the first plain is practically rainless from a few miles south of Lahore; the average annual rainfall is less than 10 inches, and even this small fall diminishes as the Indus runs seawards. Cultivation throughout the whole of this area is impossible, unless the river

river water is utilized. The financial results of the inundation and irrigation canals here are satisfactory. The population is sparse, and dependent upon the water of the rivers, the supply of which is constant, the sources of the river Indus and its tributaries being derived from the ice and snow of the Himalayas.

A considerable portion of the Punjaub, though more favoured in its rainfall, is still greatly dependent upon artificial means for an adequate supply of water. The North-West Provinces and Oude are still more fortunate; in fact, in proportion as the Ganges approaches the sea the rainfall increases, both in intensity and regularity, reaching at Calcutta an average of about 80 inches, whilst further east the supply of rain is above 100 inches.

Without attempting a minute classification of the density of population throughout Upper India, your Committee feel justified by the general concurrence of the evidence taken before them, in pointing out certain natural conclusions. Cultivation being impossible without rain, the greater and more regular the rainfall the greater will be the population of those districts. Reversing the proposition, it may also be assumed that the smaller and more irregular the rainfall is, the sparser will be the population of that locality. The cultivation of irrigated land being more expensive than that of land watered by rain, in those districts where the rainfall is usually sufficient the cultivator is more loth to take advantage of irrigation than where he is dependent upon artificial supplies.

When, however, a drought occurs and a failure of crops ensues, the difficulty of meeting the food-wants of the district will, to a very great extent, vary according to the density of population. The less liable in ordinary years a locality is to drought, the more dense in all probability will the population be. If the Government, impressed by the sufferings of a population so affected, embark in wholesale irrigation works for their future protection, they must be prepared to find, when the recollection of the disaster has passed away, that the very cause of their apprehension, the density of the population, renders it less probable that the works constructed will prove remunerative.

Yet the financial results of works of irrigation are, in the opinion of your Committee, the best test of their utility. A railroad may traverse between its termini certain districts which it does not very materially improve, yet the work may be on the whole beneficial to the country. Unless, however, an irrigation work benefits the immediate locality in which it is placed it can be of no use to outside districts. If the cultivators permanently decline to take advantage of its offers, the inference is that the work does not accomplish the only purpose for which it is made.

The general results of irrigation in the Bengal Presidency fully justify your Committee in adopting these deductions. In Bengal proper no work is sufficiently reproductive to repay its working expenses; yet nowhere in India is the population more dense, and within the last 13 years three famines of unusual severity have afflicted its provinces. All these works were promoted and sanctioned, not as famine preventive works, unlikely to pay in ordinary years, but as profitable investments for which loans might safely be raised.

In the North West Provinces and the Punjaub the rainfall is less and the return better; though even here the general result would financially be very unsatisfactory if it were not for the revenue of the Ganges and Jumna Canals, which were constructed under very favourable circumstances, and in plains eminently suitable to irrigation.

General Dickens, in his evidence, stated that the development of irrigation was slower than had been anticipated, and Colonel Crofton corroborated his statement by saying that ten years, in his opinion, was an insufficient time for the full development of any large irrigation work. The financial effect of this slow growth of revenue is shown by the forecast of the Public Works Department of 1875 (page 409).

From that statement it appears that in 1872-1873, the income from irrigation works was taken at 50,232 *l.* It was proposed to spend between that date and 1879-80, a sum of nearly 10,000,000 *l.* in extending irrigation, and the result was estimated to be a charge at the end of that period upon the revenues of India of 156,541 *l.*, in place of the income above-mentioned.

This proposed expenditure is in connection with those undertakings which in the opinion of the officers of the Irrigation Department are most required, and most likely therefore to prove remunerative. It may therefore be safely asserted that if that proposed expenditure be much increased, the return upon it, proportionally, will be even less satisfactory.

The financial result of the large irrigation works in Upper India is such as to preclude, in the opinion of your Committee, the financial possibility of so extending them as to give general immunity from drought, even assuming, which is very questionable, that their unlimited extension would have that effect.

The quantity of wheat, rice, and other food-products exported annually from India, proves that the food supplies are in excess of the consumption of the population, although the distribution may be uneven and the want of communication between, and access to, different localities so defective as to cause periodically great local suffering.

The gradual completion of the railways now in course of construction, the prosecution of roads and other means of communication, and of irrigation works, only when likely to be remunerative, together with such measures as may generally ameliorate the condition of the agricultural classes, is the action, in the opinion of your Committee, the most likely to lead to the mitigation of the effects of periodical visitations of scarcity of famine.

Madras and Bombay.

Your Committee will now investigate the results of the irrigation works in the Presidencies of Madras and Bombay, the works in the Central Provinces not having attained sufficient maturity nor being of such dimensions as to call for special notice.

The average rainfall throughout Southern India greatly varies, but the zones of variation and their cause can be easily defined and traced when the sources of rain supply are considered and described.

The south-west monsoon strikes with great force the western coast south of Surat; it is then stopped by the Western Ghauts, so that eastward of this barrier the supply is so suddenly reduced as to cease altogether further inland. The Coromandel cost is chiefly watered by the north-east monsoon; but this rain supply diminishes in quantity as it proceeds eastwards and inland.

The country comprised within the Madras and Bombay Presidencies may be divided into three distinct zones, although it may be more convenient to classify them separately by Presidencies, taking Bombay first.

First in rainfall comes the tract of country west of the Ghauts and south of Surat, receiving from the south-west monsoon a supply of from 70 to 100 inches annually. Next, a long slice of territory lying directly eastward of the Ghauts, but expanding as it stretches northwards, with a rainfall of from 30 to 40 inches. The remainder of the Presidency is comprised within the great tract of upland country in the interior of the peninsula, and receives little of either monsoon, the rainfall of the whole area averaging less than 30 inches.

Of the Madras seaboard only a small portion receives a rain supply of above 40 inches; these exceptions being a small district around the town of Madras and a portion of the northern circars. The whole of the Presidency remaining may be divided, as Bombay, into two areas, the one receiving from its proximity to the sea a rainfall of over 30 inches, the other being further inland and coming within the compass of the dry tract of less than 30 inches, which also contains the whole of the native state of Mysore and a large portion of Hyderabad.

All the important rivers of this vast tract run eastwards, but only three, the Kristnah, the Godavery, and Cauvery, derive their sources from the rainfall on

on the Western Ghauts. Even if there were sufficient rivers, independent of the local rainfall, and upon whose supplies reliance in years of drought could be placed, the conformation of the land is not favourable to great irrigating canals such as have been constructed in Upper India upon the great plains. The broken and upland character of the rising table lands, both of the Deccan and Southern India, renders the system of wholesale canal irrigation in many of the inland districts impracticable, except at an impossible cost.

The population, moreover, throughout this area is very considerable, and is in many places, in proportion to the rainfall and the capacity of the soil, exceedingly dense. Moreover, throughout the whole of Southern India, excepting the Koncan (that tract lying between the Western Ghauts and the sea), the average rainfall is nowhere more than sufficient, and, in an enormous area, very insufficient for purposes of agriculture.

The people are, moreover, extremely poor, and in certain tracts their indebtedness and the power of the moneylender are greater than elsewhere in India.

Neither is there much trade or commerce between the towns to compensate for the want of wealth of the agricultural communities; the net receipts of the only railway in Madras being far from sufficient to meet the interest guaranteed upon its capital.

In no part of India are there found so many native irrigation works. They consist chiefly of tanks for the storage of rainwater, and are said to number in Madras alone, including all kinds, over 40,000. Anicuts or dams across running rivers, with connecting canals have, in certain places inland, also been constructed.

These works do not, however, come strictly within the cognizance of your Committee's reference, for they are outside the category of works constructed with loans, and the great majority of them were made antecedent to the establishment of British rule.

A list of those works in Bombay and Madras which are within the limits of your Committee's inquiry, will be found at page 422 of the Appendix of last year's proceedings.

Bombay.

The return from Bombay is so incomplete that no conclusions can be drawn from it. Colonel Fife, late Chief Engineer for irrigation in Western India, however, stated in his evidence that the return upon the works opened, as well as upon those partially in operation, was about $\frac{1}{2}$ per cent. in excess of working expenses. He attributed this result partly to the size of the existing establishments, originally formed to carry on a larger expenditure than has since been sanctioned, and also to the disappointingly slow growth of the income (Question 1956). In his opinion works properly designed in the Deccan would yield 5 per cent. in fifteen years from their first commencement, and this yield would increase to 10 per cent., although for the first two or three years they would not probably meet their working expenses.

Delta Navigation.

The Madras Works, constructed with borrowed money, and in operation, chiefly consist of works in the Deltas of the large rivers; the only works paying being those in the Godavery, Kristnah, and Cauvery Delta, to which an excess revenue of 12·94, 9·8, and 81·30 per cent. is respectively credited upon the capital expended. No account is however taken, in the case of the Cauvery works, of the native anicuts; but making all due allowance for this omission, the results of these works reflect great credit upon the officers who designed and carried them out.

The conditions under which they worked were, however, especially favourable, not only to irrigation, but to that combination of irrigation and navigation which is the chief characteristic of this system.

The area to be irrigated consisted of flat, alluvial plains, without roads, through which passed a great and constant supply of river water independent altogether of the real rainfall, and capable of being easily controlled and directed to any part of the surrounding delta. If, in other parts of India,

similar conditions existed, your Committee would have little hesitation in recommending an expenditure for carrying out works, the receipts from which show that they are both useful to the cultivator and remunerative to the State.

The account which your Committee have, however, given of the climate and conformation of Southern India, show that not only do not these same favourable conditions elsewhere exist, but that they are in many districts reversed. For a very large portion of the country is unsuited to canal irrigation, and the supply of river-water, with three exceptions, is precarious.

During the prolonged drought of 1876-77 the vast majority of the rain-fed tanks were either dry or their contents so reduced as to be of little utility. If, then, a drought continues for more than a year, it is clear that tanks, to be a preventive against such a continuance of dry weather, must either contain more than a year's supply of rain or be connected with streams whose sources are independent of the local rainfall.

The problem, therefore, to be solved, and the importance of which has been prominently brought before your Committee by the terrible mortality, notwithstanding the enormous State expenditure, during the late Madras famine, is, taking into consideration both the present condition of Indian finance and the natural physical difficulties to be overcome, to prescribe the practical policy to be adopted the most likely to diminish the prospect of a recurrence of such a calamity in Southern India.

Your Committee are aware that a Special Commission has been appointed by the Government of India to locally investigate the causes and magnitude of this disaster, and to report upon the remedies to be adopted. Without in any way attempting those specific or detailed recommendations for the protection of this vast area from famine such as would necessitate a preliminary inquiry into the wants and capabilities of each separate district. Your Committee desire briefly to notice the proposal laid with much confidence before them by Sir Arthur Cotton. His scheme, though applicable to the whole of India, was based upon his personal experience, mainly derived from the working of the irrigation works in the deltas of Madras.

Sir A. Cotton's schemes.

Sir Arthur Cotton proposes the summary and indefinite suspension of nearly all railway schemes and works. He would, however, devote 10,000,000 *l.* annually for the next 10 or 20 years to irrigation works, mainly canals (Question 2722); the main canals to be of such dimensions as to permit navigation. By such an expenditure he estimates that 10,000 miles of main line navigation would be constructed, at a cost of 30,000,000 *l.*, dealing with the most populous districts, whilst the remainder of this vast sum was to be spent on feeders or subsidiary works.

Sir Arthur Cotton estimates that such an expenditure would give a large return to Government (Question 2751), though your Committee were unable to ascertain the data of this conclusion, especially as he does not deem it to be within his province to consider how or at what rate of interest the money expended would be raised. Neither has he in any way attempted to estimate or make provision for the immediate rise in the cost of material and labour which so sudden and simultaneous an expenditure throughout India must inevitably produce.

The figures already embodied in this Report show how few of the most carefully examined irrigation schemes have proved remunerative, and these returns are more than confirmed by Sir Arthur Cotton himself, who, in reply to a question asking him to indicate what works constructed by the Government of India, during the last 20 years, other than those in the Madras Delta, had proved remunerative, replied, "None of the great works pay yet." (Question 2214.)

It is evident to your Committee that this scheme, though of gigantic dimensions, is of too shadowy and speculative a character to justify their noticing it, except for the purpose of emphatically rejecting it.

That

That the works in the Madras deltas, with which Sir Arthur Cotton's name is so honourably associated, are a success, has been admitted by your Committee. On the other hand, the Orissa works, the Madras irrigation works, and the navigation works of the Upper Godavery, with which his name has more recently been connected, are financially complete failures.

Your Committee cannot, however, pass without comment the statement more than once repeated by him, that the failure of these works was due to the whole power of the Government having been exercised against their completion, on account of their dread of cheap transit. (Questions 2322, 2264.)

The Government were, in the opinion of your Committee, right when, in the exercise of their discretion, they declined to invest further sums in undertakings which, from their commencement, belied the estimates and returns upon which alone they were sanctioned.

Nor do your Committee find that the causes of the financial failure of past schemes was the want of ability or energy on the part of the officers of the Public Works Department. The main cause of that failure appears to have been the placing too great reliance on the hasty generalisations of engineer promoters who, rendered over sanguine by the success of certain other undertakings, have ignored the conditions under which alone their success was achieved, and without which success was impossible.

A strong consensus of opinion has been expressed by those best acquainted with Southern India that more might be done in assisting by advances, or otherwise, the inhabitants to extend and make themselves tanks and other depositories for water. Your Committee consider this point well worthy of the notice of the Indian Government, for the impression seems well founded that since the establishment of the system of "Public Works Extraordinary" too much attention and money have been concentrated on the prosecution of those great engineering works, which, though more likely to enhance the reputation of those who carry them out, are less beneficial, in proportion to their cost, than the humbler undertakings of the old village communities.

A special Famine Insurance Fund, to the amount of 1,500,000 *l.*, was established in 1878-79 by the Government of India, of which a certain portion was to be devoted to the construction of famine preventive works. Whenever any portion of this fund is so available, there is, in the opinion of your Committee, no part of India in which it could be more advantageously utilised than in promoting small irrigation works in Southern India.

In concluding this portion of their Report, your Committee do not feel justified in drawing any comparison between the respective utility of railways and irrigation works during years of plenty or periods of scarcity, for local considerations must largely influence any such comparison. Neither are the means at hand by which the indirect benefits attributable to railways can be estimated, as is the case with irrigation. Every work of either kind must be judged by itself; for instance, water communication may, in certain parts of India, be the natural means of transit, yet to prescribe hastily for the whole of India water as the only means of communication, would result in the absurdity of attempting to construct canals intended for navigation in hilly barren districts, devoid of rain and rivers, and with little population.

Your Committee have not been able to obtain thoroughly reliable accounts, in the new prescribed form, of all the details of undertakings promoted by loans later than 1875-76, the irrigation returns since then not being sufficiently complete for any purpose of comparison.

Taking, however, the actual and estimated charges upon the revenues of India as given in the forecast of the Public Works Department, the comparison of the actual results realised by railways with those anticipated, is noteworthy.

FORECAST of PUBLIC WORKS DEPARTMENT in 1875.

YEARS.	CHARGE ON REVENUE DUE TO—		
	Guaranteed Railways.	State Railways.	TOTALS.
	Charge.	Charge.	Charge.
	£.	£.	£.
1872–73 - -	2,271,557	136,371	2,407,928
1873–74 - -	1,589,789	255,730	1,845,519
1874–75 - -	1,230,170	361,435	1,591,605
1875–76 - - -	1,684,000	460,823	2,144,823
1876–77 - -	1,496,000	469,679	1,965,679
1877–78 - -	1,442,000	497,265	1,939,265

STATEMENT showing the Annual LOSS or GAIN on account of RAILWAYS in each of the undermentioned Years.

YEAR.	Guaranteed Railways.	State Railways.	TOTALS.
	£.	£.	£.
1872–73 - -	2,214,991	109,148	2,324,139
1873–74 - -	1,529,172	205,771	1,734,943
1874–75 - -	1,244,347	275,113	1,519,460
1875–76 - -	992,170	363,104	1,355,274
1876–77 - -	277,263	498,904	776,167
1877–78 - -	+ 675,085	609,705	+ loss 65,380

The capital expenditure on railways to the end of 1872–73, was—

	£.
On Guaranteed - - - - - - -	90,660,830
— State - - - - - - - -	3,251,503
TOTAL - - - £.	93,912,333

On which a loss for that year was sustained of—

	£.
On Guaranteed - - - - - - -	2,214,991
— State - - - - - - - -	109,148
TOTAL - - - £.	2,324,139

To

To the end of 1877-78 the capital expenditure had increased to—

	£.
Guaranteed - - - - - - - -	95,420,309
State - - - - - - - - -	18,636,321
TOTAL - - - £.	114,456,630

The profit on—

	£.
Guaranteed Railways was - - - -	+ 675,085
The loss on State Railways - - - -	— 609,708
TOTAL - - - £.	+ 65,380

The startling increase in the railway income shown by the above figures is greatly attributable to the enormous food traffic during the Madras famine of 1878, stimulated by the high prices in Southern India, and by the reduction of the freight charges. Making, however, every allowance for this abnormal traffic, the railway returns show for this service an improvement which, if it can be maintained, is very satisfactory, whilst the very fact that so enormous a quantity of food was carried by them to administer to the wants of a starving population, indicates their utility in saving life during times of famine or local scarcities. It must, however, be remembered, as has already been shown, a very large proportion of the State Railways are in process of construction, so that a large part of the capital expended upon them must necessarily remain far the present unproductive.

CONCLUSIONS AND RECOMMENDATIONS.

Your Committee are of opinion that the expenditure upon railways and irrigation, the results of which they have analysed, though not remunerative in the aggregate, have, upon the whole, been beneficial to India, and that although considerable sums have been wasted and certain profitless schemes undertaken, the policy of continuing to borrow for productive public works, may, within the limits and restrictions hereinafter laid down, be continued.

Past regulations.

In deciding what the restrictions should for the future be, your Committee must consider, first, what the regulations have been in the past, how far they have failed, and whether their failure is due to the unsoundness of the principles laid down, or to the difficulty of enforcing them.

Correspondence between Home and Indian Governments.

Sir Thomas Seccombe, the late Financial Secretary to the India Office, gave in his evidence a clear and distinct summary of the correspondence on this subject between the Secretary of State in Council and the Government of India. Its general effect is to show that the Home Government have constantly endeavoured to limit the works constructed out of borrowed money to those which might be expected to be really remunerative, and for which the necessary loans could be raised in India; and that the Government of India, while admitting the soundness of those principles, desired to impose a somewhat different limit, by accepting a fixed annual charge on the revenues of India in respect of Public Works classed as Productive.

The most distinct enunciation of opinion on the part of the Home authorities was a Despatch of Lord Salisbury in 1874, in which were laid down definitely three distinct principles. 1st. That no works were to be constructed with loans, except those likely to be remunerative (*see* Question 432), by yielding in the shape of annual income a sum equal to the interest on the money expended on their construction, including interest during construction. 2nd. That famine preventive works might be made out of revenue of the year, but if that proved insufficient recourse might be made to borrowing. 3rd. That all loans for public works be raised in India, it being expedient to increase the home charges in this country.

1876, the following proposal was made by the Government of India letter to the Secretary of State. "The principle by which our expenditure on 'extraordinary' public works has been guided is, that however advantageous the extension of railroads or irrigation works may be, it would not be right to carry them on at such a rate as would require the imposition of fresh taxes. The rate of expenditure has accordingly been regulated by calculations which are given in detail in the forecasts of 1873 and 1875. These calculations show that any additional interest on account of money borrowed for the purposes of constructing 'extraordinary' works, will be met from the increased receipts derived from similar works which have been or will, from time to time, be completed and brought into operation. We consider that this method of calculation, which has now been tested by the experience of three years, is safe, and that it enables the Government to control the expenditure upon 'extraordinary works' more efficiently than if works were to be admitted under that category merely upon the faith of estimates of the returns which they may give, for such estimates are not unfrequently fallacious." To this request a refusal was sent, Lord Salisbury adhering to his previous rules, but admitting an exception in regard to works under construction.

During the financial years 1877-78 and 1878-79 additional taxation was imposed in India in order to establish an Annual Famine Insurance Fund of 1,500,000 *l.* That amount was fixed with reference to the famine expenditure, which, during the last six years, had amounted to the enormous sum (excluding loss of revenue) of 14,487,827 *l.*, of which a very large portion had been met by borrowing.

The object, therefore, of this Famine Insurance Fund was, by increasing the revenue, to avoid the constant additions to the debt of India which the prevention of periodical famines would entail, by either applying that increase of income to works likely to avert famine, and thus obviate famine expenditure, or by reducing annually debt contracted for famine, so that if famine expenditure should again become inevitable the reduction of debt made in years of prosperity would compensate for the liabilities incurred during scarcity.

This increase of taxation was sanctioned by the Secretary of State in Council, on this understanding.

Last September, the Home Authorities received a Despatch from the Indian Government adverting to the difficulty of discriminating between works strictly productive, and those only admissible as providing against the effect of famine, and proposing (Question 458) "to accept a yearly maximum dead-weight charge, to be fixed, as experience may suggest, for works constructed as productive, whether under the existing strict conditions, or as now proposed, in order to prevent famine, or give protection from famine, or diminish the expenditure for the counteraction of famine, if it occurs. In other words," they "would limit to a specific maximum amount the net expenditure for the interest on the capital cost of all such works and their maintenance, after setting off all the net income yielded by the works." In addition to the annual loss entailed by "their net existing liabilities," they proposed to add an annual sum not to exceed 25 lacs of rupees, and they thought that that amount might form a primary charge upon the Famine Insurance Fund "on the consideration that the construction of any works not fully productive, according to the existing definition, which may be thus facilitated, will cause an equivalent reduction of the ultimate liability on account of famines when they occur."

The first portion of this proposition had been already suggested by the Indian Government in 1876, and rejected by the Secretary of State in Council. The latter part of the suggestion by which it is proposed to permanently assign 25 lacs of rupees of the Famine Insurance Fund, in order to raise money for the construction of famine works, not fully productive, is an entire invertion of the object for which the fund was raised. This increase of taxation was justified as necessary, in order to meet, as far as was possible, famine expenditure for the future out of income; but to immediately appropriate a portion of the income so raised to pay the interest of new loans

was

was a proposal which, in the opinion of your Committee, the Secretary of State in Council had no option but to reject.

Cause of failure of regulations laid down.

It is clear, therefore, that the principles laid down by the Secretary of State in Council, that no works, except those likely to be remunerative, were to be constructed with loans, has hitherto failed in effect, and when your Committee examine the process through which the estimates and plans of large public works pass previous to their sanction, it is evident to them that no ordeal has been suggested by which with any certainty a remunerative return can be ensured.

If the public works which have been, or are about to be, promoted in India were certain to yield upon the capital expended 4½ per cent., the rate at which interest is charged against the loans for their construction, private enterprise might be expected to undertake them without a guarantee. It is, however, because there is no element of certainty as to their yielding any such income that private enterprise has hitherto, with few exceptions, and most of those disastrous failures, declined, without guarantees or great concessions, to embark in these enterprises.

The yield from railways may so improve that this present reluctance may be overcome as regards their promotion, though in the present state of the exchanges it is not probable, but large irrigation works, must on account of the peculiar relations existing between the Government and the cultivators, be undertaken by the State alone.

Even in this country, with all the publicity and criticism which great engineering enterprises invoke, schemes are constantly undertaken by companies, which financially are complete failures. Yet every individual shareholder, before investing his money, is presumed to have satisfied himself that there was a reasonable prospect of his investment proving remunerative.

In India, where there is little or no publicity and still less extraneous engineering talent ready to criticise and suggest, the investigation to which projects emanating from the Public Works Department must be subject is slight when compared with that to which private enterprise in this country is liable. If an able engineer, confident in his power to overcome natural difficulties, puts forward a scheme, which, if his figures be realised, will confer great benefits upon the locality affected, and if the Government of India, after subjecting this scheme to full examination, are unable to detect any flaw in it, they, under existing rules, might sanction it, as complying with the condition that it will be remunerative.

When sanctioned and commenced, unforeseen difficulties may occur, the price of labour and material may rise, or possibly some hurricane, flood, or drought may seriously disturb the whole plan of the work, and little by little the prospect of remuneration may vanish, until it may become doubtful if the work will pay more than its working expenses.

The remedy which in such cases is suggested, is to transfer the work to those within the category of ordinary and construct it out of ordinary revenue. This, however, is only possible if there is a surplus, provided there be no surplus, money must be borrowed, or the work postponed; if there be a surplus, and a portion of it be absorbed in an unremunerative work, financially speaking, that sum would have been better employed in reducing debt.

Moreover, whenever a work is transferred to the ordinary account, and nominally constructed out of current income, no charge is made for interest against the sums, whether they have been borrowed or not, expended in its construction. If it brings in any revenue the ordinary income of the year is swelled by it, but all account of its cost is lost sight of. It is difficult, therefore, to conceive any procedure by which greater facilities are offered to the Public Works Department to efface "all bad bargains," than to lay down a rule by which works, on account of their failure to comply with the sole condition upon which they were sanctioned, may be transferred to an account where they are lost sight of.

It is evident to your Committee that if the best and most efficacious control over the expenditure of a Department, situated as the Public Works Department is, in India, is to be obtained by an intelligible form of account giving the capital expenditure, working expenditure, and interest of every large undertaking, it is of paramount importance, if we are to apply to this account the test of results, that those works which pay the least, and have in proportion to their income cost the most, should be included, and not excluded, from that account.

Alterations recently made in forms of account.

Your Committee approve of the forms of account prescribed by the Secretary of State in Council in 1877, and filled up by General Dickens. They are at present incomplete, both as regards the returns from Madras and Bombay, as well as the proportion of the general central establishment charges and superannuation allowances which should be charged against that portion of the Public Works Department employed in connection with the Public Works Extraordinary Expenditure. It would be also desirable that in the detailed account, given on page 422, the works wholly or partly constructed by the old Native Governments, should be distinguished from those wholly constructed by or under the British Government, and that in one of the accounts the charge for interest during construction should also be shown as part of the capital expenditure.

The experience of the past will doubtless, in future, make the Government of India more cautious in sanctioning the promotion of public works, and the Public Works Department less sanguine in promoting public works of a reproductive character. Yet the short tenure of appointment in India, as well as the constant change in the *personnel* of the high officials of that Government, renders some more consistent and permanent check advisable.

Alternative systems of check.

The whole of the expenditure upon productive public works, being now treated as capital outlay to be met by borrowing, renders it apparently possible to adopt a permanent system of control, either by annually limiting the capital expenditure itself, or else, as suggested by the Government of India, by limiting "to a specific maximum amount the net expenditure for the interest on the capital cost of all such works and their maintenance after setting off all the net income yielded by the works," and within the limits allowing the contracting of capital liabilities. Your Committee will consider the last proposal first.

The general result of the expenditure upon works classed as productive, so far as at present can be ascertained, has placed an annual but varying loss upon the revenues of India. The proposal of the Government of India, last September, was to accept for five years as a dead weight upon Indian revenues this loss, adding to it 25 lacs of rupees to pay for the interest of sums raised for new famine protective works. In other words, their proposal would have ultimately placed at the disposal of the Public Works Department an income composed of, 1st, the receipts from these works; 2nd, a fixed sum termed by Government of India "dead weight" sufficient to establish an equilibrium between the income derived from and current expenditure connected with these works; and, 3rd, 25 lacs of rupees.

Provided, therefore, the interest on the sums borrowed did not exceed the aggregate of this income, works might be constructed to any extent.

For two reasons your Committee cannot accept these suggestions. First, because the adoption of such a plan would be the admission of the principle that works, sanctioned and constructed as remunerative, might afterwards be accepted as a permanent charge upon the revenues of India; and, secondly, because the scheme affords no check whatever to the possible and ultimate amount of that charge.

As the capital account of productive works annually increases, every year's increase means a larger sum of interest to be paid, and a larger charge for maintaining and managing works in operation. Unless, therefore, the development of revenue from these works is proportionately progressive, the amount of "dead weight" cannot remain stationary, but will annually vary, being dependent upon the amount of the receipts from the works to which it refers. But these receipts greatly fluctuate, especially during years of famine,

as is shown by the account just received from India, from which it appears that the revenue of these works is,—

	£.
According to the Actual Accounts of 1877–78 the Revenue from these works was - - - - - - - - -	7,319,679
By the Regular Estimates of 1878-79 (eight months of which are figures of Actual Account) is to be - - - -	6,569,000
Which Budget Estimates for 1879-80 anticipate a revenue of - - - - - - - - - - -	6,856,000

So far, therefore, from the plan in question affording any data on which an opinion could be formed as to undertaking new works, propositions for new works made after a year of comparatively good financial results might be sanctioned, which would be rejected if the results of the same year had been unfavourable, and thus, instead of the determination of the Government being guided by the prospect in regard to the works proposed to be undertaken, it would be influenced by the favourable or unfavourable result in the most recent year of works long previously commenced, and wholly or partially completed.

It is futile, therefore, to attempt to control capital expenditure by assigning a certain sum out of the revenues of India, as the limit beyond which no liability is to be incurred unless the receipts or revenue to which this sum is added can be equally regulated and estimated. As this cannot be done, this and any other method of control based upon this principle may be dismissed from consideration.

The only other practicable check is to limit the amount of the annual capital outlay.

Your Committee, after careful consideration, are prepared to make the following recommendations:— Definite recommendations.

That the construction of new works from borrowed money for the future be limited to those schemes alone which, upon the responsibility of the Government are estimated to be productive, by yielding an annual income equal to the interest on the capital expended in their construction, including, in such capital, interest during construction.

That the amount to be annually expended upon productive public works should mainly depend upon the financial condition of India (and should, therefore, for the present, be limited to an amount of 2,500,000 *l.*, as recently fixed by the Secretary of State for India in Council).

That in furtherance of the above recommendations, 2,500,000 *l.* should be the maximum amount to be raised in any one year by the Indian Government (in addition to existing liabilities) for the prosecution of productive public works.

That the debt incurred for productive public works be kept separate from the permanent or general debt of India.

That all expenditure on the construction of productive public works should be treated as borrowed money, so that, if instead of borrowing to the full extent of such expenditure a part of the surplus revenue of the year can be devoted to this purpose, the general debt of India be treated as relieved, and the productive public works debt as increased to such extent.

That if in any year the financial condition of India should admit of an increase in the expenditure on productive public works by devoting to that purpose surplus revenue, care should be taken that the permanent establishments be not so increased as to prove burdensome in years less generally prosperous.

That the accounts of the Public Works and Financial Departments be reconciled, so that in future there may be only one accepted official account relating to productive public works.

That a full statement of the income derived from, and expenditure (both current and capital) upon these works, form an integral part of the Annual Financial Statement of the Government of India.

The danger of raising fresh loans in India will diminish in proportion as the contribution from the general revenue of India for the payment of the

interest due upon them decreases. If, year by year, this amount diminishes, and year by year the public works receipts increase, such a confidence will be established in the productiveness of these works as may induce local authorities or private individuals to undertake them without a guarantee or concession.

It has been contended that notwithstanding the annual increase to the productive works capital expenditure, the increased receipts from the older works more than compensate for the interest payable on the new capital raised. The recommendations of your Committee suggest a form of account and a procedure by which the accuracy of this contention can be easily tested. If the loss on these works annually diminishes, and the railway mileage and number of irrigation works annually increase, every year must give the Indian Government a property returning a better percentage on the capital expended in creating it. If, on the other hand, the direct loss to the state yearly increases, it is only right that this result should be both known and shown.

The danger to the finance of India of the present system is, that no separate account has been taken of loans raised for public works; but, that being raised on the security of the general revenue of India, it has never been hitherto shown in the Annual Revenue and Expenditure Account whether the interest has been met by the productiveness of the works constructed.

Borrowing in England.

From the evidence given before your Committee, the fact that the Secretary of State in Council has frequently objected to the policy of raising Indian loans in England for public works in India is more than ever apparent to your Committee. The difficulty of enforcing this regulation is very evident from the evidence of Sir Thomas Seccombe, who states that notwithstanding the great reluctance of the Home authorities to borrow here, the force of circumstances has been so strong that since 1873–74, out of loans amounting to 31,877,279 *l.*, 10,990,779 *l.* only has been raised in India, the remainder, 20,886,500 *l.*, having been obtained in England. Of this sum of 31,877,279 *l.*, 4,500,000 *l.* was for the redemption of certain East Indian Stock, making the total real addition to the public debt over 27,000,000*l.*

	£.
The expenditure upon famine relief during the same period was	14,487,827
Upon productive public works	25,341,076
£.	39,828,903

the difference between the sum borrowed and expended being met out of revenue and the cash balances, which at the commencement of this period were unusually high.

The difficulties of the past six years have no doubt been abnormal, the famine expenditure in India having at times so depleted the cash balances as to render them insufficient to meet the drafts of the Secretary of State, whilst the exchange difficulties prevented the Secretary of State, at other times, from obtaining purchasers for his drafts upon India, although there were the requisite funds in the treasuries there.

Your Committee, while making allowance for these difficulties, are clearly of opinion that loans for Public Works in India should always be raised in India, unless the Secretary of State in Council should be satisfied that the difference between the rates of interest in England and India is so considerable as to afford full compensation for the disadvantages which inevitably attend borrowing in this country. And they concur in the communication of the Secretary of State to the Viceroy, in which he requests that, whenever it is possible, a certain portion of the Famine Insurance Fund should be remitted to this country, and applied to investment in, and thus to the reduction of the debt raised in London for famine expenditure.

Your Committee are also of opinion that greater opportunities should be afforded to natives in the interior of the country to subscribe in small sums to the loans of the Indian Government. Your

Your Committee have not inquired into the various harbour or port improvements effected by local authorities with borrowed money, for this would have involved an investigation into engineering details and plans which they did not consider it necessary to make. Where such moneys are borrowed from Government they should be separately shown in the accounts, and any loans raised by the Government of India for such advances would be distinct from the loans raised for public works classed as productive. Harbour Works.

A suggestion was made to your Committee that a body analogous to the Public Works Loans Commissioners should be established in India to make advances to local authorities and municipalities. In this country the main advantage gained by the existence of the Public Works Commission is, that there is associated with the Government a body of bankers and merchants whose financial experience is valuable in dealing with schemes for public works proposed by local authorities. But there is no evidence that the intervention of such a body in India would be productive of practical advantage. Public Works Loan Commissioners.

At the same time it is, in the opinion of your Committee, essential that no loans to local authorities should be made except on the security of revenues derived from local sources fully adequate for the interest and repayment of the loans.

The existing establishment of Europeans in the Public Works Department in India is, in the opinion of your Committee, too large for the work they have to perform, and will be still more in excess under the reduced expenditure on public works proposed for the future. Further, the heavy cost of their maintenance reduces largely the profits otherwise attributable to the works with which they are connected. Establishments.

The European engineers employed have been drawn from various sources, and their degree of efficiency has been very various. At the same time the native employés are more and more becoming efficient assistants, and there is much reason to hope that a cheaper native agency may to a considerable extent be substituted for a part of the European agency hitherto employed. Your Committee therefore recommend that as opportunity occurs this change should be made as far as possible. It is the more necessary because existing circumstances seem to show that the present arrangements do not afford a sufficient flow of promotion to the junior officers of the European establishment, and that a demand is already arising for pensions and other arrangements by which the non-effective charges would be largely swelled, as has been the case in regard to the military and civil services. Your Committee would therefore recommend that the numbers admitted to Cooper's Hill with a view to their employment in the Public Works Department should be carefully adjusted with regard to the future requirements of the service, and that the establishments in India should be at once reduced.

In making these recommendations, your Committee have avoided laying down any but general principles capable of easy application, for they have no wish whatever to interfere with the functions of the Indian Executive, upon whom the responsibility of adjusting details according to changing circumstances, and to the varying requirements of different localities, must primarily rest.

In concluding their Report, your Committee gladly take an opportunity of expressing their appreciation of the great value of much of the evidence given before them, the careful arrangement of the masses of figures by General Dickens, as well as the thorough knowledge and preparation exhibited by him and other witnesses, which tended greatly to shorten and elucidate the complex inquiry your Committee were directed to make.

24 *July* 1879.

PROCEEDINGS OF THE COMMITTEE.

Tuesday, 24th February 1879.

MEMBERS PRESENT:

Mr. Sampson Lloyd.	Mr. John Cross.
Mr. Fawcett.	Lord George Hamilton.
Mr. Onslow.	Mr. Edward Stanhope.
Mr. Childers.	Mr. Balfour.

Lord GEORGE HAMILTON was called to the Chair.

The Committee deliberated.

[Adjourned till Thursday, the 6th March, at Twelve o'clock.

Thursday, 6th March 1879.

MEMBERS PRESENT:

Lord GEORGE HAMILTON in the Chair.

Mr. Childers.	Mr. Agnew.
Mr. John Cross.	Mr. Onslow.
Mr. Hardcastle.	Mr. Fawcett.
Mr. Edward Stanhope.	Mr. Ernest Noel.
Sir George Campbell.	Mr. Grant Duff.

Mr. *Juland Danvers* and Mr. *W. Sowerby* were severally examined.

[Adjourned till Friday, 14th March, at Half-past Twelve o'clock.

Friday, 14th March 1879.

MEMBERS PRESENT:

Lord GEORGE HAMILTON in the Chair.

Mr. Childers.	Mr. Agnew.
Sir George Campbell.	Mr. Ernest Noel.
Mr. Fawcett.	Mr. Onslow.
Mr. Sampson Lloyd.	Mr. Ashbury.
Mr. John Cross.	

Mr. *W. Sowerby* was further examined.

Sir *Thomas Seccombe* was examined.

[Adjourned till Thursday next, at Half-past Twelve o'clock.

Thursday, 20th March 1879.

MEMBERS PRESENT:

Lord GEORGE HAMILTON in the Chair.

Mr. Agnew.	Mr. Onslow.
Mr. John Cross.	Mr. Fawcett.
Mr. Ashbury.	Mr. Childers.
Sir George Campbell.	Sir Joseph M'Kenna.
Mr. Sampson Lloyd.	Mr. Edward Stanhope.
Mr. Ernest Noel.	

Sir *Thomas Seccombe* was further examined.

[Adjourned till To-morrow, at Half-past Twelve o'clock.

Friday, 21st March 1879.

MEMBERS PRESENT:

Lord GEORGE HAMILTON in the Chair.

Mr. John Cross.	Mr. Fawcett.
Mr. Onslow.	Mr. Agnew.
Mr. Sampson Lloyd.	

Sir *Thomas Seccombe* was further examined.

[Adjourned till Thursday, 15th May, at Half-past Twelve o'clock.

Thursday, 15th May 1879.

MEMBERS PRESENT:

Lord GEORGE HAMILTON in the Chair.

Mr. Childers.	Mr. Ernest Noel.
Mr. Fawcett.	Mr. Ashbury.
Mr. Onslow.	Mr. Hardcastle.
Sir George Campbell.	Mr. Agnew.
Mr. Sampson Lloyd.	Mr. Grant Duff.
Mr. Edward Stanhope.	Mr. Balfour.
Sir Joseph M'Kenna.	Mr. Mulholland.

DRAFT REPORT, proposed by the *Chairman*, read the first time, as follows:—

"INDIAN PUBLIC WORKS.

"1. YOUR Committee have throughout their inquiry kept carefully in view the limits of the reference made to them, and they have not considered it desirable to prolong their proceedings by taking evidence upon other branches of Indian Finance, except so far as was necessary to enable them to arrive at definite conclusions upon the specific subject referred to them for investigation.

"2. The expenditure connected with Public Works in India, from money raised on loan, differs from the other annual disbursements made by that Government, and included in the annual revenue and expenditure accounts presented to Parliament, inasmuch as it is an annual investment deliberately incurred by borrowing in order to produce certain anticipated results.

"3. The information therefore obtained by your Committee, and the suggestions which they consequently are prepared to make, may be conveniently divided into three heads:

"1. The origin and growth of the present system of constructing on loan public works in India.

"2. Results of that system, so far as they can be ascertained.

"3. The alterations and safeguards which, considering the condition of Indian Finance, are, in the opinion of your Committee necessary to secure the prosecution of reproductive public works upon a safe and intelligible basis.

"THE ORIGIN OF THE PUBLIC WORKS DEPARTMENT.

"4. Previous to 1854 public works of all description were carried on by the engineer department of the army, under the superintendence of a military board in each of the three Presidencies. If the work required to be done was civil, engineers were lent to the Civil Department, or else the works were undertaken by the military board. The financial control exercised depended upon the nature of the undertaking; if military, the Military Department were responsible; if civil, the Home Department, or the local government within whose jurisdiction the work was carried out. Under this system of military supervision, as may be imagined, little was done to increase the productive power of India, in fact, the only civil works constructed previous to 1854, worth noticing, were portions of the Jumna and Ganges Canals and the Great Trunk Road to the North. All expenditure incurred under this system was treated as ordinary expenditure, and charged against the revenue of the year.

Questions 27 to 38.

"5. In 1854 Lord Dalhousie abolished the military boards, substituting in their place a chief engineer under each of the local governments, and at the same time forming a Central Public Works Secretariat at Calcutta for the general supervision of the local establishment, and out of the organisation thus instituted has been gradually developed the present Public Works Department.

"6. The works to be executed and the expenditure to be controlled, naturally divided themselves at the outset into two different heads:—

"1st. That relating to the maintenance and erection of civil and military buildings, the repair and construction of roads, and the other multifarious works necessary for the smooth and effective working, by the administration of a great empire.

2nd. The construction and extension of works of public utility, such as railways, irrigation canals and harbours, which although not absolutely necessary for purposes of administration, were calculated to increase the wealth, and promote the prosperity of the country.

"7. The cost of the first-named works, as being essential for purposes of Government, had, from the first, with one exception hereafter to be noted, been charged as ordinary expenditure against the revenue of the year, whilst those in the latter category have almost uniformly been made with borrowed money, though the agency by which they have been constructed, and the methods of borrowing, have greatly varied.

"8. As the investigations of your Committee have been mainly confined to the works constructed with money raised on loan, they do not consider it necessary to enumerate, from the formation of the Public Works Department to the present time, all the various alterations made in it by successive Viceroys. As its wants grew and its expenditure increased, the Department expanded into separate divisions, comprising at the present moment a military works branch, a civil buildings and roads branch, an irrigation branch, and a railway branch. It would also be beyond the province of their inquiry if the Committee were to trace the process of the policy of decentralisation commenced by Lord Mayo, by which a large and increasing portion of the works connected with civil building works and roads was transferred to the control of the various local governments, inasmuch as the cost of these classes of works are defrayed from the revenue of the year.

"9. A very large expenditure has been incurred during the last 20 years by the erection of barracks, in order to provide for the accommodation of the additional European forces stationed in India subsequent to the mutiny of 1857. This outlay was, in the opinion of the Indian Government, so necessary and pressing, that in 1865 and 1866 they requested leave to include it within the category of public works, the cost of which might legitimately be defrayed by loans. Although sanction was at one time given by the Secretary of State in Council to the request, yet it was so soon afterwards withdrawn and rescinded, that your Committee merely notice the transaction in order to express their strong opinion that all disbursements of this character should be included in the ordinary expenditure, and met by the ordinary revenue of the year.

"10. The only undertakings, therefore, with the exception of a few harbour works constructed for the enlargement of the great seaports of India, which have continuously been constructed out of loans, with the sanction both of the Home and Indian Government,

ment, are railways and irrigation works. A short account of the policy pursued in reference to each class of work will best illustrate what has been done, and with what result.

"RAILWAYS.

"11. One of the undoubted objects of Lord Dalhousie in substituting new machinery for the construction of public works was to provide for an augmentation of the expenditure upon works of public utility. In regard to the construction of railways, he proposed a form of guaranteed companies in which the companies were to receive a guarantee of 5 per cent. from the Indian Government on the capital raised by them for the construction of railways, their operations within certain limits being under the control of the Government. These proposals, with certain modifications, were finally adopted, and from 1846 to 1867 all railways constructed in India were made through the agency of the guaranteed companies.

"12. This policy, although it led to the rapid and continuous application of capital to railway extension in India, was not conducive to economy either in the execution of the work or in the working of the lines, and the Indian Government finding it difficult to obtain the consent of companies to the alterations in the contract necessary in their opinion to insure proper control and economy, determined to discard indirect agency, and undertake the works and the working of future lines themselves.

"13. A full and detailed statement of the reasons prompting the Government of India to take upon themselves this additional responsibility, will be found in a Minute in the Appendix, written by Lord Lawrence, and dated the 9th January 1869. In the main arguments of this Memorandum your Committee concur. From that time no fresh contracts, except for small extensions of existing lines, have been entered into with guaranteed companies; and the Indian Government have themselves raised the money and executed the works.

"14. The total amount raised by the guaranteed companies up to the 31st March 1878, was 95,420,309 *l.*, and the sums expended by the State, 18,636,321 *l.*, making a total of 114,056,630 *l.*

"15. This expenditure has given to India, up to April 1878, 7,552 miles of railway, of which 5,913 miles are constructed on a gauge of 5 ft. 6 in., 1,639 miles on a gauge of 3 ft. 3 in. Mr. Danvers' Report, 1878.

"16. Although the railway system of India is by no means complete, yet the mileage connects Bombay, Madras, and Calcutta, traverses India from north to south, and, by passing through the great plains, places railway communication within reach of almost all the great towns of the country. It may therefore fairly be said to have almost completed the great trunk lines originally designed.

"17. The following Table gives the annual rate at which this railway outlay has been incurred, from the year 1845–46 to 1877–78.

YEAR.	Guaranteed Railways.	State Railways.	TOTAL.	YEAR.	Guaranteed Railways.	State Railways.	TOTAL.
	£.	£.	£.		£.	£.	£.
1845–46	—	—	—	1863–64	4,755,653	—	4,755,653
1846–47	—	—	—	1864–65	4,122,240	—	4,122,240
1847–48	—	—	—	1865–66	5,636,866	—	5,636,866
1848–49	—	—	—	1866–67	7,297,703	—	7,297,703
1849–50	75,893	—	75,893	1867–68	7,120,081	594	7,120,675
1850–51	99,263	—	99,263	1868–69	3,867,927	552,398	4,420,325
1851–52	351,323	—	351,323	1869–70	4,742,851	190,870	4,933,721
1852–53	427,560	—	427,560	1870–71	3,776 270	449.372	4,225,642
1853–54	670,649	—	670,649	1871–72	2,496,728	644,620	3,141,348
1854–55	1,730,156	—	1,730,156	1872–73	477,245	1,413,649	1,890,894
1855–56	3,366,411	—	3,366,411	1873–74	693,053	2,354,625	3,047,678
1856–57	3,515,100	—	3,515,100	1874–75	1,087,911	3,014,180	4,102,091
1857–58	3,423,068	—	3,423,068	1875–76	950,806	3,165,184	4,115,990
1858–59	5,492,108	—	5,492,108	1876–77	715,459	2,865,861	3,581,320
1859–60	7,171,464	—	7,171,464	1877–78	1,312,250	3,984,968	5,297,218
1860–61	7,578,715	—	7,578,715				
1861–62	6,602,212	—	6,602,212				
1862–63	5,863,344	—	5,863,344	£.	95,420,309	18,636,321	114,056,630

"18. The capital expenditure of the guaranteed companies was not shown in the Revenue and Expenditure Accounts presented annually to Parliament, the only charges in connection with their outlay being the amount annually debited against the revenue of the year, to make good the difference between the interest guaranteed, and the net receipts received by the Government, and the cost of supervision and of land provided for the lines.

"19. When, however, the State undertook the construction of railways, the capital annually so expended was termed Extraordinary Expenditure, and though placed outside

the ordinary expenditure was charged against the revenue on the understanding that, if the revenue were unable to meet this charge, the funds might be obtained by borrowing. As a matter of fact, a considerable portion of the Extraordinary Public Works expenditure has been met by surplus revenues. Your Committee proposes to treat all such Expenditure as borrowed money, it being obvious that the surpluses so absorbed might otherwise have been applied to the reduction of existing liabilities, and that a separation of the capital account, either of railways or of irrigation works, into two portions, one bearing and the other not bearing interest, would make the real cost or profit of such works to the State a matter almost beyond the possibility of calculation.

"IRRIGATION.

"20. The annual uncertainty and great variation of the rainfall renders cultivation in many parts of India precarious and fruitless without the storage and distribution of water, and to meet this ever recruiting difficulty irrigation works of all sizes and methods have for centuries past been in existence in these districts. Many of these beneficent works were destroyed by the internecine wars preceding the establishment of British rule, whilst the number and utility of those left was much diminished by want of repairs, disuse, and decay. It is impossible to estimate what the value, in a pecuniary sense, was of the works so transferred or left to the British Government by the Native rulers. Certain sums were from time to time, previous to the establishment of the Public Works Department, expended in their repair and extensions; this expenditure was small, distributed without much method, and bore but little result.

"21. Lord Dalhousie was desirous of annually expending a certain sum raised on loan in promoting irrigation, and in establishing the Public Works Department he designated two millions sterling as the sum to be annually so applied. His retirement and the outbreak of the Indian Mutiny postponed the carrying out of these proposals.

"22. In 1858, great pressure being brought upon the Government of India to promote irrigation by the same means, as they were then extending railway communication, the Madras Irrigation Company was formed, with a Government guarantee of 5 per cent. upon a capital of 1,000,000 *l.*, and a few years after another private company undertook, without any guarantee, the construction of a system of irrigation canals in Orissa. Both these experiments have proved costly failures to the State. The arrangements between the Secretary of State in Council and the Orissa Company soon became so involved that it was considered advisable to terminate them by the purchase of the works of the Company at a valuation much above their market value. This sale was effected at a time when the company was practically bankrupt. The Madras Irrigation Company since its formation has succeeded for one year only in meeting its working expenses. The Secretary of State has, in addition to the guaranteed rate, advanced, free of interest, 600,000 *l.* to the directors of the companies, of which 228,000 *l.* has been repaid; 1,372,000 *l.* has, therefore, been swallowed up by this undertaking, without any return whatever to the State.

"23. Warned by these fiascos of private enterprise, the Government of India determined to construct themselves all irrigation works for the future. This decision was arrived at in 1867, and from that time all expenditure upon the extension of irrigation works likely to be remunerative, has been, together with State railways, termed extraordinary, and the money required has been obtained by borrowing.

"24. Treating all irrigation expenditure as money raised on loan, we find that the total expenditure up to 1876-77 was 17,635,779 *l.*

	State.	Madras Irrigation and Canal Company.	TOTAL.
	£.	£.	£.
Up to 1866-67 inclusive - - - -	6,612,495	964,833	7,577,328
1867-68 to 1876-77 - - - - -	9,651,618	406,833	10,058,451
TOTAL - - - £.	16,264,113	1,371,666	17,635,779

"25. The expenditure upon irrigation extension may therefore be said to have passed through three phases, firstly, for the period from the establishment of our rule to 1854, when the annual disbursements were small and spasmodic, and met from revenue; and secondly, from 1854 to 1867, during which time the experiment of private companies was tried in addition; thirdly, from 1867, the date of the extraordinary public works policy, under which all sums were undertaken by the State, and a sum from one to two millions sterling was devoted annually to their prosecution.

"26. The

" 26. The existing establishment of the Public Works Department being supposed to be inadequate to the new demands thus imposed on it, in 1870 an engineering college was established in England for the supply of highly trained engineer officers, and in 1874 a new member was added to the Viceroy's Council, to personally superintend the policy and control the expenditure of the department to which the construction of railways and canals in India was to be solely entrusted.

" 27. In 1873 the Public Works Department sent home a forecast as to the probable results of a proposed annual expenditure for the next five years of four millions and a-half sterling, three millions to be devoted to railways, one and a-half to irrigation.

" In 1875 a revised forecast was received, in which the proposed expenditure was reduced to four millions annually; 2,700,000 *l.* for railways, the remainder for irrigation; the actual expenditure for the last three years has been, in:—

" 1876–77 - - - - - - - -	£. 4,031,320
" 1877-78 - - - - - - - -	4,638,035
" 1878-79 - - - - - - - -	4,551,000

" Details of this outlay will be found in the Appendix.

" 28. The policy embodied in this increased outlay was originally justified on the assumption that the works comprised in the category of, and sanctioned as, Public Works Extraordinary, would, with few exceptions, prove remunerative, that is, that the direct receipts from them would more than meet the interest of the sums expended on their construction, plus their working expenses. How far this assumption has been realised will be seen when your Committee consider that portion of their inquiry relating to—

" The results, financial and otherwise, of the railways and irrigation works already *constructed or sanctioned.*

" 29. The direct annual gain or loss to the State from railway outlay since 1858, is as follows:— Railway results.

	GUARANTEED RAILWAYS.					STATE RAILWAYS.				
YEAR.	Capital Raised to end of each Year.	Capital withdrawn for Expenditure to end of each Year.	Net Traffic Receipts, less Moieties of Surplus Profits Repaid to Companies.	Guaranteed Interest.	Loss or *Gain* to State.	Capital Expended.	Net Traffic Receipts.	Interest at 4½ per Cent.	Loss or *Gain* to State.	TOTAL Loss or *Gain* to State.
	£.	£.	£.	£.	£.	£.	£.	£.	£.	£.
1858-59	22,998,405	19,151,531	232,365	838,411	606,046	- -	-	- -	- -	606,046
1859-60	28,573,287	26,322,995	403,057	1,199,929	796,872	- -	-	- -	- -	796,872
1860-61	34,397,817	33,901,710	389,413	1,485,745	1,096,332	- -	-	- -	- -	1,096,332
1861-62	42,979,539	40,503,922	391,162	1,788,153	1,396,991	- -	-	- -	- -	1,396,991
1862-63	48,218,541	46,367,266	625,615	2,166,755	1,541,140	- -	-	- -	- -	1,541,140
1863-64	54,332,994	51,122,919	821,548	2,456,182	1,634,634	- -	-	- -	- -	1,634,634
1864-65	57,541,917	55,245,159	1,129,851	2,683,787	1,553,936	- -	-	- -	- -	1,553,936
1865-66	60,860,247	60,882,025	2,865,574	2,889,241	23,667	- -	-	- -	- -	23,667
1866-67	67,258,917	68,179,728	2,347,085	3,031,087	684,002	- -	-	- -	- -	684,002
1867-68	76,571,751	75,299,809	1,989,112	3,480,677	1,491,565	594	-	14	14	1,491,579
1868-69	82,417,905	79,167,736	2,229,509	3,881,013	1,651,504	552,992	*1,379*	12,455	13,834	1,665,338
1869-70	86,773,325	83,910,587	2,627,941	4,126,025	1,498,084	743,862	*790*	29,180	29,970	1,528,054
1870-71	91,426,816	87,686,857	2,556,707	4,341,609	1,784,902	1,193,234	68	43,585	43,517	1,828,419
1871-72	93,550,303	90,183,585	2,877,153	4,542,183	1,665,030	1,837,854	*4,068*	68,199	72,262	1,737,292
1872-73	93,736,915	90,660,830	2,554,485	4,608,418	2,053,933	3,251,503	5,362	114,510	109,148	2,163,081
1873-74	94,725,814	91,353,883	3,241,189	4,617,923	1,376,734	5,606,128	*6,474*	199,297	205,771	1,582,505
1874-75	95,119,118	92,441,794	3,454,848	4,643,901	1,189,053	8,620,308	44,982	320,095	275,113	1,464,166
1875-76	95,072,441	93,392,600	3,729,034	4,637,891	908,857	11,785,492	96,027	459,131	363,104	1,271,961
1876-77	94,833,129	94,108,059	4,433,151	4,658,681	225,530	14,651,353	88,021	*587,625	498,964	724,434
1877-78	96,313,173	95,420,309	5,396,790	4,655,285	*741,505*	18,636,321	127,774	*737,479	609,705	*131,800*
		£.	44,295,589	66,732,896	22,437,307	£.	350,128	2,571,470	2,221,342	24,658,649

* These amounts are taken from the Finance and Revenue Accounts. The other sums in this column are estimated.

" 30. No accurate comparison as to the financial results of the two different systems of railway construction can be drawn from the above Table. The continuous annual application of capital to any particular object must always leave that portion of the outlay expended in works, not yet in operation, unproductive. So long as the guaranteed system was in force, a certain proportion of the capital of the companies thus remained fallow. When the indirect agency was abolished and State construction substituted, the amount of work remaining to be finished by the Company, and the capital necessary for its completion, annually diminished, until the whole of their capital may now be said to be bearing some return. On the other hand, a very large proportion of the State expenditure sunk in railways is locked up in railways not yet completed. Your Committee have, therefore, combined the results derived from both systems.

" 31. The above Table shows that this railway expenditure has not, in the strict sense of the word, been remunerative, for in every year except 1877–78 the State has been obliged to furnish a considerable sum to meet the difference between the net receipts and the interest due on the capital raised.

" 32. On the other hand, these works have undoubtedly been productive; and notwithstanding the increase to the capital account by annual borrowing, the return upon the whole expenditure is annually improving, and the loss to the State annually diminishing.

" 33. Your Committee, however, in pointing out this undoubted result, feel bound to again lay emphasis on the fact that this portion of the public works, constructed on loan, is not in itself directly remunerative, although they, for reasons hereafter to be stated, do not question the expediency of appropriating for the present, from the revenues of India, a certain sum annually to make good the loss caused to the State by the construction of railways in India.

" 34. If the annual loss had not been met out of the general revenues of India, but had been yearly added to the capital actually expended, the results as regards the returns would have been far less advantageous to the railways. On the other hand, your Committee have not taken into consideration any of the indirect benefits directly traceable to railway communication, such as enhancement of the value of land, the opening of new markets, the impetus given to the export trade, the reduction in military establishments from greater power of transport and concentration, and the many other benefits derived from rapid and easy inter-communication in a territory of the enormous area of India.

" 35. Without in any way ignoring these collateral gains, it must be remembered, that originally the policy of borrowing for the construction of public works was promoted on the ground, not that the indirect benefits would be a sufficient compensation for the direct financial loss, but that the State would have the benefit of a remunerative return, in addition to indirect advantages.

" 36. The returns derived from irrigation works which have in part or wholly been made by borrowed money are somewhat complex, and at present incomplete.

" 37. No estimate has been, or can be, given of the pecuniary value of the old native works to which additions have been made by the Public Works Department. For instance, the capital expenditure on one of the Madras Works, upon which a very large return is claimed, does not include the value of the old work upon which the British undertaking was founded. The Public Works officers, examined before your Committee, do not, however, consider that the value of these old native works, even if it could be accurately ascertained, would make any appreciable difference in the returns claimed from the works constructed more recently.

Irrigation results.

" 38. The revenue derived from irrigation is termed direct and indirect. By direct receipts is meant the water-rate paid for the use of the water; by indirect, the enhanced value of the land due to the vicinity of the canal or tank. As, however, the systems of land tenure and assessment differ, so the method of payment for the use of the water varies. In the Bengal Presidency that portion of the land revenue due to irrigation can not only be traced, but is annually included in the returns presented by the Accountant of the Public Works Department.

" 39. In Madras and Bombay, where a different form of land settlement has been established, some difficulty has been experienced in separating the payment for water from that for the use of the land; so much so that the only returns your Committee have been able to obtain, through General Dickens' investigation, is not complete as regards the receipts from certain of the Madras works, whilst to none of the works in Bombay proper is any indirect revenue credited. The Scinde returns are, however, complete.

" 40. This statement (which will be found page 422 of the Appendix) is compiled in accordance with the instructions sent to the Government of India by the Secretary of State in Council, by which, for the first time, an attempt was made to present annually to Parliament, in a concise shape, the actual financial result of the irrigation expenditure. Previous to that time all the interest due on money raised on loan and sunk in irrigation works was included in the interest payable on the general debt, and was not shown in a separate statement; the working expenses were included under the head of Public Works Ordinary, whilst on the revenue side the whole indirect receipts were returned as part of the land revenue, the only sums credited to irrigation being the direct payments made in the shape of water rates.

" This arrangement was very misleading, and so long as it was continued it was difficult even for officers of the Public Works or Financial Departments to ascertain the exact annual financial results of the expenditure, whilst the task was wholly beyond the means either of individual Members of your House or of the general public.

" 41. Your Committee accept, therefore, as sufficiently accurate for the purpose of showing the loss or gain on the whole irrigation expenditure, the following statement, furnished

furnished by General Dickens, with the assistance of the Financial Department of the India Office, for the year 1875-76 :—

Total Expenditure.	Total Receipts.	Working Expenses.	Interest 4½ per Cent.	Excess; Revenue.
£.	£.	£.	£.	£.
15,562,655	1,228,993	396,750	700,319	131,924

"42. This return is, at first sight, satisfactory; but a further analysis is necessary before your Committee can make clear the probable result of a continuation of the present irrigation expenditure.

"43. Taking the local provinces separately, the following Table shows the great variation in results:—

	Total Expenditure.	Total Receipts.	Working Expenses.	Interest.	Excess or Deficiency.
	£.	£.	£.	£.	£.
Bengal - - -	4,072,742	23,043	52,949	183,237	—213,179
North West Provinces	4,939,527	375,659	145,015	222,279	+ 8,465
Punjaub - - -	3,335,503	288,360	136,214	150,097	+ 2,049
Scinde - - -	667,704	161,368	- -	30,047	+ 132,103
Bombay - - -	665,938	4,090	- -	29,967	— 25,877
Madras - - -	1,881,241	376,473	62,572	84,656	+ 229,245

"44. This classification brings out in strong contrast the use made of the works by the inhabitants of different provinces; Scinde irrigation, according to the above figures, giving a return of 19·66 per cent. on a capital of 667,704 *l.*; Bengal, a loss of 5·23, on a capital of 4,072,742 *l.* The Madras return does not include the Madras Irrigation Company.

"45. If from the sum total of the above works the revenue is deducted due to certain works, a remarkable fluctuation is again shown. The main revenue of the Punjaub and North West Provinces is derived from the Ganges and Jumna canals, and in Madras the Cauvery, Kristna, and Godavery works supply the whole revenue, the remaining works showing an excess of expenditure. In Scinde all the irrigation works, with a single exception, are remunerative. Classifying the works as below, we get the following remarkable results :—

	Capital.	Return after meeting Interest and Working Expenses.	Per Centage.
	£.	£.	£.
Scinde Irrigation Works - - - - -	667,704	132,103	19·66
Ganges - - - - - - - -	2,826,479	42,808	1·51
East Jumna - - - - - - -	231,743	47,946	20·68
West Jumna - - - - - - -	432,764	84,010	19·42
Cauvery - - - - - - -	116,072	108,923	81·30
Godavery - - - - - - -	736,444	94,351	12·94
Kristna - - - - - - - -	463,590	45,630	9·8
£.	5,474,796	555,771	
The remaining works, including the Madras Irrigation Company - - - - -	10,197,869 1,372,000	— 421,859 — 46,453	
£.	11,569,869	— 488,312	

"It is also worthy of notice that, according to this statement, no single canal in Bengal pays even its working expenses.

"46. This very great variation is due, in the opinion of your Committee, not to accident or engineering mistakes; on the contrary, the general causes of failure and success can be so easily traced, and are so intimately connected with the second part of their investigation, the effect of these works in preventing or mitigating famine, that both should be considered together.

"47. The various famines which during the last century have devastated different parts of India have all mainly, if not entirely, arisen from drought.

"48. It is therefore too frequently assumed that as want of rain is the primary cause of failure of crops, the prevention of famine could be easily and profitably accomplished by the State undertaking, in all parts of India, works for the storage and distribution of water, whose utility would be so readily recognised by the population in their vicinity as to render their construction remunerative to their promoters and reproductive to the locality.

"49. These wholesale assumptions altogether ignore the enormous area of India, the difference between the physical conformation, soils, crops, and climate of its various provinces, and above all the very great variation in the rainfall.

"50. Sir George Campbell (a Member of your Committee), in his evidence, gave a detailed account of the rain supply of India, as well as of the course and ordinary movement of the monsoons supplying that rainfall. A map published in the 1872-73 Statement of the Moral and Material Progress of India, so well illustrates his observations, that your Committee have deemed it advisable to reprint it.

Upper India.

"51. The great plains of India, north of the Vindhya Mountains, may be divided for meteorological purposes into the tracts traversed by the Indus and other rivers passing through the Punjaub to the Arabian Sea, and those watered by the Ganges and Jumna on their way to the Bay of Bengal.

"52. The greater part of the south-western portion of the first plain is practically rainless for a few miles south of Lahore; the average annual rainfall is less than 10 inches, and even this small fall diminishes as the Indus runs seawards. Cultivation throughout the whole of this area is impossible, unless the river water is utilized. The financial results of the inundation and irrigation canals here are satisfactory. The population is sparse, and entirely dependent upon the water of the rivers, the supply of which is constant, the sources of the river Indus and its tributaries being derived from the ice and snow of the Himalayas.

"53. A considerable portion of the Punjaub, though more favoured in its rainfall, is still greatly dependent upon artificial means for an adequate supply of water. The North-West Provinces and Oude are still more fortunate; in fact, in proportion as the Ganges approaches the sea the rainfull increases, both in intensity and regularity, reaching at Calcutta an average of about 80 inches, whilst further east the supply of rain is above 100 inches.

"54. Without attempting a minute classification of the density of population throughout Upper India, your Committee feel justified by the general concurrence of the evidence taken before them, in pointing out certain natural conclusions. Cultivation being impossible without rain, the greater and more regular the rainfall the greater will be the population of those districts. Reversing the proposition, it may also be assumed that the smaller and more irregular the rainfall is, the sparser will be the population of that locality. The cultivation of irrigated land being more expensive than that of land watered by rain, in those districts where the rainfall is usually sufficient, the cultivator is more loth to take advantage of irrigation than where he is more dependent upon artificial supplies.

"55. When, however, a drought occurs and a failure of crops ensues, the difficulty of meeting the food wants of the district will, to a very great extent, vary according to the density of population. The less liable in ordinary years a locality is to drought, the more dense in all probability will the population be. If the Government, impressed by the sufferings of a population so affected, embark in wholesale irrigation works for their future protection, they must be prepared to find, when the recollection of the disaster has passed away, that the very cause of their apprehension, the thickness and density of the population, renders it less probable that the works constructed will prove remunerative.

"56. Yet the financial results of works of irrigation are, in the opinion of your Committee, the best and only test of their utility. A railroad may traverse between its termini certain districts which it does not very materially improve, yet the work may be on the whole beneficial to the country. Unless, however, an irrigation work benefits the immediate locality in which it is placed it can be of no use to outside districts. If the cultivators permanently decline to take advantage of its offers, the inference is that the work does not accomplish the only purpose for which it is made.

"57. The

"57. The general results of irrigation in the Bengal Presidency fully justify your Committee in adopting these deductions. In Bengal proper no work is sufficiently reproductive to repay its working expenses; yet nowhere in India is the population more dense, and within the last 13 years three famines of unusual severity have afflicted its provinces. All these works were promoted and sanctioned as safe-guards against drought, though not as famine preventive works, unlikely to pay in ordinary years, but as profitable investments for which loans might safely be raised.

"58. In the North West Provinces and the Punjaub the rainfall is less and the return better; though even here the general result would financially be very unsatisfactory if it were not for the revenue of the Ganges and Jumna Canals, which were constructed under very favourable circumstances, and in plains eminently suitable to irrigation.

"59. General Dickens, in his evidence, stated that the development of irrigation was slower than had been anticipated, and Colonel Crofton corroborated his statement by saying that 10 years, in his opinion, was an insufficient time for the full development of any large irrigation work. The financial effect of this slow growth of revenues shown by the forecast of the Public Works Department of 1875 (page 409).

"60. From that statement it appears that in 1872-1873, the income from irrigation works was 50,232 *l.* Between that date and 1879-1880, it is proposed to spend a sum of upwards of 10,000,000 *l.* sterling in extending irrigation, and the result is estimated to be charge at the end of that period upon the revenues of India of 156,541 *l.*, in place of the income at first obtained.

[These accounts do not include any returns from the Bombay and Madras Works, upon which an expenditure of 2,000,000 *l.* is contemplated, although the charge for interest on this money is included.]

"This proposed expenditure is in connection with those undertakings which in the opinion of the officers of the Irrigation Department are most required, and most likely therefore to prove remunerative. It may therefore be safely asserted that if that proposed expenditure be much increased, the return upon it, proportionally, will be even less satisfactory.

"61. The financial result of the large irrigation works in Upper India is such as to preclude, in the opinion of your Committee, the financial possibility of so extending them as to give general immunity from drought, even assuming, which is very question able, that their unlimited extension would have that effect.

"62. The areas protected by existing works in the Bengal Presidency were given (page 96, Question 1398), by Colonel Rundall, in a Paper laid by Lord Northbrook before your Committee, as expressing to a great extent his views. Taking the cultivable area of the three divisions of the Presidency, he states that out of an area of

56,000 square miles in the Punjaub - - - -	17,000 were protected.
40,000 square miles in the North Western Provinces -	25,000 were protected.
78,000 square miles in Bengal - - - - -	12,000 were protected.

"Colonel Crofton, the Inspector General of Irrigation in India, generally confirms these figures, although he considers the area protected in the North West Provinces to be considerably less. (Question 1398, and following.)

"63. This return was given in 1874, large expenditure having meanwhile occurred in extending works; the area protected now is considerably greater.

"64. The revenue and canal officers estimate that if one-third of the cultivable area were actually irrigated, or capable of being irrigated, that would be sufficient protection for the remaining two remaining two-thirds.

"65. The increasing quantity of wheat and other food-products exported annually from Bengal, proves that the food supplies are annually in excess of the wants of the population, although the distribution may be uneven and the want of communication between, and access to, different localities so defective as to cause periodically great local suffering.

"66. To render Upper India secure against periodical visitations of scarcity and famine must be the work of time. The gradual completion of the railways now in course of construction, the prosecution of roads and other means of communication, and of irrigation works, only when likely to be remunerative, together with such measures as may generally ameliorate the condition of the agricultural classes, is the action, in the opinion of your Committee, the most likely to achieve that end.

"67. Your Committee will now investigate the results of the irrigation works in the Presidencies of Madras and Bombay, the works in the Central Provinces not having attained sufficient maturity nor being of such dimensions as to call for special notice. Madras and Bombay.

 "68. The

The average rainfall throughout Southern India greatly varies, but the zones of ...n and their cause can be easily defined and traced when the sources of rain supply ...nsidered and described.

" 69. The south-west monsoon strikes with great force the western coast, south of Surat; it is then stopped by the Western Ghauts, so that eastward of this barrier the supply is so suddenly reduced as to cease altogether further inland. The Coromandel cost is chiefly watered by the north-east monsoon; but this rain supply diminishes in quantity as it proceeds eastwards and inland.

" 70. The country comprised within the Madras and Bombay Presidencies may be divided into three distinct zones, although it may be more convenient to classify them separately by Presidencies, taking Bombay first.

" 71. First in rainfall comes the tract of country west of the Ghauts, and south of Surat, receiving from the south-west monsoon a supply of from 70 to 100 inches annually. Next, a long slice of territory lying directly eastward of the Ghauts, but expanding as it stretches northwards, with a rainfall of from 30 to 40 inches. The remainder of the Presidency is comprised within the great tract of upland country in the interior of the peninsula, and receives little of either monsoon, the rainfall of the whole area averaging less than 30 inches.

" 72. Of the Madras seaboard only a small portion receives a rain supply of above 40 inches; these exceptions being a small district around the town of Madras and a portion of the northern circars. The whole of the Presidency remaining may be divided, as Bombay, into two areas, the one receiving from its proximity to the sea a rainfall of over 30 inches, the other being further inland and coming within the compass of the dry tract of less than 30 inches, which also contains the whole of the native state of Mysore and a large portion of Hyderabad.

" 73. All the important rivers of this vast tract run eastwards, but only three, the Kristnah, the Godavery, and Cauvery, derive their sources from the rainfall on the Western Ghauts. Even if there were sufficient rivers, independent of the local rainfall, and upon whose supplies reliance in years of drought could be placed, the conformation of the land is not favourable to great irrigating canals such as have been constructed in Upper India upon the great plains. The broken and upland character of the rising table lands, both of the Deccan and Southern India, render the system of wholesale canal irrigation in many of the inland districts impracticable, except at an impossible cost.

" 74. The population, moreover, throughout the whole of this area is very considerable, and is, in proportion to the rainfall, more dense than in almost any other part of India, for throughout the whole of Southern India, excepting the Koncan (that tract lying between the Western Ghauts and the sea), the average rainfall is nowhere more than sufficient, and, in an enormous area, very insufficient for purposes of agriculture.

" 75. The people are, moreover, extremely poor, and in certain tracts their indebtedness is greater, and the power of the moneylender more supreme than elsewhere in India.

" 76. Neither is there much trade or commerce between the towns to compensate for the want of wealth of the agricultural communities; the net receipts of the only railway in Madras being far from sufficient to meet the interest guaranteed upon its capital.

" 77. In no part of India are there found so many native irrigation works. They consist chiefly of tanks for the storage of rainwater, and are said to number in Madras alone, including all kinds, over 40,000. Anicuts or dams across running rivers, with connecting canals have, in certain places inland, also been constructed.

" 78. These works do not, however, come strictly within the cognizance of your Committee's reference, for they are outside the category of works constructed with loans, and the great majority of them were made antecedent to the establishment of British rule.

" 79. A list of those works in Bombay and Madras which are within the limits of your Committee's inquiry, will be found at page 422 of the Appendix of last year's proceedings.

Bombay.

" 80. The return from Bombay is so incomplete that no conclusions can be drawn from it. Colonel Fife, late Chief Engineer for irrigation in Western India, however, stated in his evidence that the return both upon the works opened, as well as upon those partially in operation, was about ½ per cent. in excess of working expenses. He attributed this result partly to the size of the existing establishments, originally framed to carry on a larger expenditure than has since been sanctioned, and also to the disappointingly slow growth of the income (Question 1956). In his opinion works properly designed in the Deccan would yield 5 per cent. in 15 years from their first commencement, and this yield would increase to 10 per cent., although for the first two or three years they would not probably meet their working expenses.

Delta Navigation.

" 81. The Madras Works, constructed with borrowed money, and in operation, chiefly consist of works in the Deltas of the large rivers; the only works paying being those in the Godavery, Kristnah, and Cauvery Delta, to which an excess of revenue of 12·94, 9·8, and

and 81·30 per cent. is respectively credited upon the capital expended. No account is, however, taken, in the case of the Cauvery works, of the native anicuts; but making all due allowance for this omission, these works reflect great credit upon the officers who designed them and carried them out.

" 82. The conditions under which they worked were, however, especially favourable, not only to irrigation, but to that combination of irrigation and navigation which is the chief characteristic of this system.

" 83. The area to be irrigated consisted of flat, sandy, alluvial plains, without roads, through which passed a great and constant supply of river water independent altogether of the real rainfall, and capable of being easily controlled and directed to any part of the surrounding delta. If, in other parts of India, similar conditions existed, your Committee would have little hesitation in recommending an expenditure for carrying out works, the receipts from which show that they are both useful to the cultivator and remuerative to the State.

" 84. The account which your Committee have, however, given of the climate and conformation of Southern India, show that not only do not these same favourable conditions elsewhere exist, but that they are in many districts reversed. For a very large portion of the country is unsuited to canal irrigation, and the supply of river-water, with three exceptions, is precarious.

" 85. During the prolonged drought of 1876–77 the vast majority of the rainfed tanks were either dry or their contents so reduced as to be of little utility. If, then, a drought continues for more than a year, it is clear that tanks, to be a preventative against such a continuance of dry weather, must either contain more than a year's supply of rain or be connected with streams whose sources are independent of the rainfall.

" 86. The problem, therefore, to be solved, and the importance of which has been prominently brought before your Committee by the terrible mortality, notwithstanding the enormous State expenditure, during the late Madras famine, is, taking into consideration both the present condition of Indian finance and the natural physical difficulties to be overcome, to prescribe the practical policy to be adopted the most likely to diminish the prospect of a recurrence of such a calamity in Southern India.

" 87. Your Committee are aware that a Special Commission have been appointed by the Government of India to locally investigate the causes and magnitude of this disaster, and to report upon the remedies to be adopted. This Commission have had the means of obtaining evidence on the spot, and of eliciting from native witnesses information and particulurs which it is not possible for your Committee to attempt.

" 88. Without, however, in any way infringing upon the functions of this tribunal, or attempting the specific and detailed recommendations (which a local inquiry would alone justify), your Committee feel it their duty to consider the proposal laid with much confidence before them by Sir Arthur Cotton. This scheme, though applicable to the whole of India, was based upon his personal experience, mainly derived from the working of the irrigation works in the deltas of Madras. Sir A. Cotton's schemes.

" 89. Sir Arthur Cotton proposes the summary and indefinite suspension of nearly all railway schemes and works. He would, however, devote 10,000,000 *l.* annually for the next 10 or 20 years to irrigation works, mainly canals (*see* Question 2922); the main canals to be of such dimensions as to permit navigation. By such an expenditure he estimates that 100,000 miles of main line navigation would be constructed, costing 30,000,000 *l.*, dealing with the most populous districts, the remainder to be spent on feeders.

" 90. Sir Arthur estimates such an expediture would give a large return to Government (2751), though your Committee were unable to ascertain the data of this conclusion, especially as he does not consider it within his province to consider how or at what rate of interest the money expended would be raised. Neither has he in any way attempted to estimate or make provision for the immediate rise in the cost of material and labour which so sudden and simultaneous an expenditure throughout India must inevitably produce.

" 91. The figures already embodied in this Report show how few of the most carefully examined irrigation schemes have proved remunerative, and these returns are more than confirmed by Sir Arthur Cotton himself, who, in reply to a question asking him to indicate what works constructed by the Government of India, during the 20 years, other than those in the Madras Delta, had proved remunerative, replied, " None of the great works pay yet." (Question 2214.)

" 92. It is evident to your Committee that this scheme, though of gigantic dimensions, is of too shadowy and speculative a character to justify their noticing it, except for the purpose of emphatically rejecting it.

" 93. That the works in the deltas, with which Sir Arthur Cotton's name is so honourably associated, are a success, has been admitted by your Committee. On the other hand, the Orissa works, the Madras irrigation works, and the navigation works of the River Godavery, with which his name has more recently been connected, are complete failures.

"94. Your Committee cannot, however, pass without comment the insinuation, more than once repeated by him, that the failure of these works was due to the whole power of the Government being exercised against their completion, on account of their dread of cheap transit. (Questions 2322, 2362.)

"95. The Government were, in the opinion of your Committee, right when, in the exercise of their discretion, they declined to invest further sums in undertakings which, from their commencement, belied the estimates and returns upon which alone they were sanctioned.

"96. Neither can your Committee admit that the failure of past navigation schemes is due to want of ability or energy on the part of the officers entrusted to carry them out. On the contrary, they were most favourably impressed by the candour, knowledge, and ability of those officers of the Public Works Department who appeared before them.

"97. If the Government have sanctioned in the past faulty estimates and speculative schemes, their error is mainly due to thus placing too great reliance in the hasty generalisations of engineers who, over-sanguine by the success of their undertakings, have ignored the conditions under which alone their success was achieved, and without which success was impossible.

"98. A strong consensus of opinion has been expressed by those best acquainted with Southern India that more might be done in assisting by advances, or otherwise, the inhabitants to extend and make themselves tanks and other depositories for water. Your Committtee consider this point well worthy of the notice of the Indian Government, for the impression seems well founded that since the establishment of the system of "Public Works Extraordinary" too much attention and money have been concentrated on the prosecution of those great engineering works, which, though more likely to enhance the reputation of those who carry them out, are less beneficial, in proportion to their cost, than the humbler undertakings of the old village commuities.

"99. A special Famine Insurance Fund, to the amount of 1,500,000 *l.*, was established in 1878-79 by the Government of India, of which a certain portion was to be devoted to the construction of famine preventive works. Whenever any portion of this fund is so available, there is, in the opinion of your Committee, no part of India in which it could be more advantageously utilised than in promoting small irrigation works in Southern India.

"100. In concluding this portion of their Report, your Committee do not feel justified in drawing any comparison between the comparative utility of railways and irrigation works during years of plenty or periods of scarcity, for local considerations must largely influence any such comparison. Neither are the means at hand by which the indirect benefits attributable to railways can be estimated, as is the case with irrigation. Every work of either kind must be judged by itself; for instance, water communication may, in certain parts parts of India, be the natural means of transit, yet to prescribe hastily for the whole of India water as the only means of communication, would result in the absurdity of attempting to construct canals intended for navigation in hilly barren districts, devoid of rain and rivers, and with little population.

"101. Your Committee have not been able to obtain thoroughly reliable accounts, in the new prescribed form, of all the details of undertakings promoted by loans later than 1875-76, the irrigation returns since then not being sufficiently complete for any purpose of comparison.

"102. Taking, however, the forecast of the Public Works Department in 1875, the comparison with the actual results realised by railways with those anticipated, is noteworthy.

"FORECAST OF PUBLIC WORKS DEPARTMENT IN 1875.

YEARS.	CHARGE ON REVENUE DUE TO			
	Guaranteed Railways.	State Railways.	Irrigation Works.	Entire Operations.
	Charge.	Charge.	Income.	Charge.
	£.	£.	£.	£.
1872–73 - - -	2,271,557	186,371	50,232	2,357,696
1873-74 - -	1,589,789	255,730	64,686	1,780,833
1874–75 - -	1,230,170	361,435	25,900	1,565,705
1875-76 - -	1,684,000	460,823	Charge 34,571	2,179,394
1876-77 - -	1,496,000	469,679	45,241	2,010,920
1877–78 - -	1,442,000	497,265	83,041	2,022,306
1878–79 - -	1,313,000	527,765	122,441	1,963,206
1879–80 - -	1,215,000	568,265	156,541	1,939,806

"STATEMENT

"STATEMENT showing the Annual LOSS or GAIN on account of PUBLIC WORKS EXTRAORDINARY in each of the undermentioned Years.

YEAR.	Guaranteed Railways.	State Railways.	Irrigation.	TOTAL.
	£.	£.		
1872–73 - -	2,214,991	109,148	Can only be given for Bengal, North Western Provinces, and Punjab, as at pages 400 and 401 of last year's Blue Book.	
1873–74 - -	1,529,172	205,771		
1874–75 - -	1,244,347	275,113		
1875–76 - -	992,170	363,104		
1876–77 - -	277,263	498,904		
1877–78 - -	+ 675,085	609,705		

"103. The capital invested in railways in 1872–73, was—

	£.
Guaranteed - - - - - - - -	90,660,830
State - - - - - - - - -	3,251,503
TOTAL - - - £.	93,912,333

"On which a loss was sustained of—

	£.
Guaranteed - - - - - - - -	2,214,991
State - - - - - - - - -	109,148
TOTAL - - - £.	2,324,139

"In 1877–78 the capital was—

	£.
Guaranteed - - - - - - - -	95,420,309
State - - - - - - - - -	18,636,021
TOTAL - - - £.	114,456,630

"Gain or profit on—

	£.
Guaranteed - - - - - - - -	+ 675,085
State - - - - - - - - -	— 609,708
TOTAL - - - £.	+ 65,280

"104. The very startling contrast of the above figures is greatly attributable to the enormous food traffic on the railways during the Madras famine of 1876—1878, a traffic very much due to the high prices in Southern India, and to the reduction in the freight charges, of which reduction the Government have borne one-half. Making, however, every allowance for this abnormal traffic, the railway returns show a gratifying elasticity, whilst the very fact that so enormous a quantity of food was carried by them to administer to the wants of a starving population, indicates their utility in saving life during times of famine or local scarcities.

"CONCLUSIONS AND RECOMMENDATIONS.

"105. Your Committee are of opinion that the expenditure upon railways and irrigation, the results of which they have analysed, though not remunerative, has, upon the whole, been beneficial to India. That although considerable sums have been wasted and certain useless schemes undertaken, yet the policy of continuing to borrow for productive public works, may, within the limits and restrictions hereinafter laid down, be continued.

"106. In deciding what the restrictions should for the future be, your Committee must consider, first, what the regulations have been in the past, how far they have failed,

and whether their failure is due to the unsoundness of the principles laid down, or to the difficulty of enforcing them.

"107. Sir Thomas Seccombe, the late Financial Secretary of the India Office, gave in his evidence a clear and succinct summary of the correspondence between the Secretary of State in Council and the Viceroy, which had taken place on this subject. The general tendency of that correspondence has been a desire on the part of the Home authorities to limit the construction of works by means of borrowed money to such works as might be expected to be remunerative, and for which the necessary loans could be raised in India, and on that of the Government of India, whilst admitting the soundness of that principle, to substitute a fixed annual charge on the revenues in respect of productive works, and to proceed with the construction of other works, provided that the fixed annual charge be not exceeded.

"108. The most distinct enunciation of opinion on the part of the Home authorities was a Despatch of Lord Salisbury in 1874, in which were laid down definitely three distinct principles. 1st. That no works were to be constructed with loans, except those likely to be remunerative (*see* Question 432), by yielding in the shape of annual income a sum equal to the interest on the money expended on their construction, including interest during construction. 2nd. That famine preventive works might be made out of revenue of the year, but if that proved insufficient recourse might be made to borrowing. 3rd. That all loans for public works be raised in India, it being expedient to increase the home charges in this country. The first of these rules did not apply to works already sanctioned and commenced.

"109. In 1876, the following proposal was made by the Government of India in a letter to the Secretary of State. 'The principle by which our expenditure upon "extraordinary" public works has been guided is, that however advantageous the extension of railroads or irrigation works may be, it would not be right to carry them on at such a rate as would require the imposition of fresh taxes. The rate of expenditure has accordingly been regulated by calculations which are given in detail in the forecasts of 1873 and 1875. These calculations show that any additional interest on account of money borrowed for the purposes of constructing "extraordinary" works, will be met from the increased receipts derived from similar works which have been or will, from time to time, be completed and brought into operation. We consider that this method of calculation, which has now been tested by the experience of three years, is safe, and that it enables the Government to control the expenditure upon "extraordinary works" more efficiently than if works were to be admitted under that category merely upon the faith of estimates of the returns which they may give, for such estimates are not unfrequently fallacious.' To this request a refusal was sent, Lord Salisbury adhering to his previous rules, but admitting an exception in regard to works under construction.

"110. During the financial years 1877–78 and 1878–79 additional taxation was imposed in India to establish an Annual Famine Insurance Fund of 1,500,000 *l.* That amount was fixed with reference to the famine expenditure, excluding loss of revenue which, during the last six years, had amounted to the enormous sum of 14,487,827 *l.*, of which a very large portion had been met by borrowing.

"The object, therefore, of this Famine Insurance Fund, was, by increasing the revenue, to prevent the constant additions to the debt of India which the prevention of periodical famines would entail, by either applying that increase of income to works likely to avert famine, and thus obviate famine expenditure, or by reducing annually debt contracted for famine, so that if famine expenditure should again become inevitable, the reduction of debt made in years of prosperity would compensate for the liabilities incurred during scarcity.

"This increase of taxation was sanctioned by the Secretary of State in Council, on this understanding.

"111. Last September, the Home Authorities received a Despatch from the Indian Government adverting to the difficulty of discriminating between works strictly productive and those only admissible as providing against the effect of famine, and proposing (Question 458) 'to accept a yearly maximum dead-weight charge, to be fixed, as experience may suggest, for works constructed as productive, whether under the existing strict conditions, or as now proposed, in order to prevent famine, or give protection from famine, or diminish the expenditure for the counteraction of famine, if it occurs. In other words,' they 'would limit to a specific maximum amount the net expenditure for the interest on the capital cost of all such works and their maintenance, after setting off all the net income yielded by the works.' That amount they would for the next five years fix at 25 lacs of rupees in any one year, in addition to their 'existing net liabilities,' and they thought that the Famine Insurance Fund of one million and-a-half sterling might be safely reduced by that sum 'on the consideration that the construction of any works not fully productive, according to the existing definition, which may be thus facilitated, will cause an equivalent reduction of the ultimate liability on account of famines when they occur.'

"112. The first portion of this proposition had been already suggested by the India Government in 1876, and rejected by the Secretary of State in Council. The latter part of the suggestion, by which it is proposed to permanently assign and mortgage 25 lacs of rupees

rupees of the Famine Insurance Fund, in order to raise money for the construction of famine works, not fully productive, is an entire invertion of the object for which the Fund was raised. This increase of taxation was justified as necessary in order to meet, as far as was possible, famine expenditure for the future out of income; to immediately appropriate a portion of the income so raised to pay the interest of new loans was a proposal which, in the opinion of your Committee, the Secretary of State in Council had no option but to reject.

"113. It is clear, therefore, that the principle so consistently laid down by the Secretary of State in Council, that no works, except those likely to be remunerative, were to be constructed with loans, has hitherto failed in practice, and when your Committee examine the process through which the estimates and plans of large public works pass previous to their sanction, it is evident to them that no ordeal has or can be suggested by which with any certainty a return can be ensured.

"114. If the return from public works which have been, or are about to be, promoted in India was certain to produce 4½ per cent., the rate of which interest is charged against the loans for the construction, private enterprise might be expected to undertake them without a guarantee. It is, however, because there is no element of certainty as to their yielding any such income that private enterprise has hitherto, with few exceptions, and those disastrous failures, declined, without guarantees or great concessions, to embark in these enterprises.

"115. The yield from railways may so improve that the present reluctance may be overcome as regards their promotion, though in the present state of the exchanges it is not probable, but irrigation works, must on account of the relations between the Government and the cultivators, be undertaken by the State alone.

"116. Even in this country, with all the publicity and criticism which great engineering enterprises invoke, schemes are constantly undertaken by companies which financially are complete failures. Yet every individual shareholder, before investing his money, has satisfied himself that there was a reasonable prospect of his investment proving remunerative.

"117. In India, where there is little or no publicity and still less extraneous engineering talent ready to criticise and suggest, the investigation to which projects emanating from the Public Works Department must be subject is slight compared with that of private enterprises in this country. If an able engineer, confident in his power to overcome natural difficulties, puts forward a scheme which, if his figures be realised, will confer great benefits upon the locality affected, and if, after subjecting this scheme to examination, the Finance Department are unable to detect any flaw in its estimates, the Government of India would, in all probability, under existing rules, unhesitatingly sanction it, as complying with the condition that it will be remunerative.

"118. When sanctioned and commenced, unforeseen difficulties may occur, the price of labour and material may rise, or possibly some hurricane, flood, or drought may seriously disturb the whole plan of the work, and little by little the prospect of remuneration may vanish, until it may become doubtful if the work will pay more than its working expenses.

"119. The remedy which in such cases is suggested, is to transfer the work to those within the category of ordinary and construct it out of ordinary revenue. This, however, is only possible if there is a surplus, provided there be no surplus, money must be borrowed, or the work postponed; if there be a surplus, and a portion of it be absorbed in an unremunerative work, financially speaking, that sum would have been better employed in reducing debt.

"120. Moreover, whenever a work is transfered to the ordinary account, and nominally constructed out of current income, no charge is made for interest against the sums, whether they have been borrowed or not, expended in its construction. If it brings in any revenue the ordinary income of the year is swelled by it, but all account of its cost is lost sight of. It is difficult, therefore, to conceive any procedure by which greater facilities are offered to the Public Works Department to efface 'all bad bargains,' than to lay down a rule by which works, on account of their failure to comply with the sole condition upon which they were sanctioned, may be transferred to an account where they are lost sight of.

"121. It is evident to your Committee that if the best and most efficacious control over the expenditure of a Department, situated as the Public Works Department is, in India, is to be obtained by an intelligible form of account giving the capital expenditure, working expenditure, and interest of every large undertaking, it is of paramount importance, if we are to apply to this account the test of results, that those works which pay the least, and have in proportion to their income cost the most, should be included, and not excluded, from that account.

"122. Your Committee approve of the forms of account prescribed by the Secretary of State in Council in 1877, and filled up by General Dickens. They are at present incomplete, both as regards the returns from Madras and Bombay, as well as the propor-

tion of the general central establishment charges and superannuation allowances which should be charged against that portion of the Public Works Department employed in connection with the Public Works Extraordinary Expenditure.

"123. The experience of the past will doubtless, in future, make the Finance Department more careful before sanctioning, and the Public Works Department less sanguine in promoting public works of a reproductive character. Yet the short tenure of appointment in India, as well as the constant change in the *personnel* of the high officials of that Government, renders some more consistent and permanent check advisable.

"124. The whole of the expenditure upon these works, being now treated as capital outlay to be obtained by borrowing, renders it apparently possible to adopt a permanent system of control, either by annually limiting the capital expenditure itself, or else, as suggested by the Government of India, by limiting 'to a specific maximum amount the net expenditure for the interest on the capital cost of all such works and their maintenance after setting off all the net income yielded by the works,' and within the limits allowing the contracting of capital liabilities. Your Committee will consider the last proposal first.

"125. The result of this productive expenditure, so far as at present can be ascertained, has placed an annual but varying loss upon the revenues of India. The proposal of the Government of India, last September, was to accept for five years as a dead weight upon Indian revenues this loss, adding to it 25 lacs of rupees to pay for the interest of sums raised for new famine protective works. In other words, their proposal would have ultimately placed at the disposal of the Public Works Department an income composed of, 1st, the receipts from these works; 2nd, a sum termed 'dead weight' sufficient to establish an equilibrium between the income derived from and current expenditure connected with these works; and, 3rd, 25 lacs of rupees.

"Provided, therefore, the interest on the sums borrowed did not exceed the aggregate of this income, works might be constructed to any extent.

"126. For two reasons your Committee cannot accept these suggestions. First, because the adoption of such a plan would be the admission of the principle that works, sanctioned and constructed as remunerative, might afterwards be accepted as a permanent charge upon the revenues of India; and, secondly, because the scheme affords no check whatever to the possible and ultimate amount of that charge.

"127. As the capital account of productive works annually increases, every year's increase means a larger sum of interest to be paid, and a larger charge for maintaining and managing works in operation. Unless, therefore, the development of revenue from these works is proportionately progressive, the amount of 'dead weight' cannot remain stationary, but will annually vary, being dependent upon the amount of the receipts from the works to which it refers. But these receipts greatly fluctuate, especially during years of famine, as is shown by the account just received from India, from which it appears that the revenue of these works is,—

		£.
"1877–78.	Actual Accounts - - - - -	7,319,679
"1878–79.	Regular Estimates - - - - -	6,569,000
"1879–80.	Budget Estimates - - - - -	6,856,000

"128. So far, therefore, from the plan in question affording any data on which an opinion could be formed as to undertaking new works, propositions for new works made after a year of comparatively good financial results might be sanctioned, which would be rejected if the results of the same year had been unfavourable, and thus, instead of the determination of the Government being guided by the prospect in regard to the works proposed to be undertaken, it would be influenced by the favourable or unfavourable result in the most recent year of works long previously commenced, and wholly or partially completed.

"129. It is futile, therefore, to attempt to control capital expenditure by assigning a certain sum out of the revenues of India, as the limit beyond which no liability is to be incurred unless the receipts or revenue to which this sum is added can be equally regulated and estimated. As this cannot be done, this, and any other method of control based upon this principle, may be dismissed from consideration.

"130. The only other practicable check is to limit the amount of the annual capital outlay, it being, in the present financial condition of India, a primary object to diminish, as soon as is possible, the annual loss upon the reproductive expenditure.

"131. Your Committee, after careful consideration, are prepared to make the following recommendations:—

"That the construction of new works from borrowed money for the future be limited to those schemes alone which may be expected to be productive by yielding, in the shape of annual income, a sum equal to the money expended on their construction, including interest during the construction.

"That 2,500,000 *l.* be the maximum of the amount to be raised in any one year by the Indian Government (in addition to existing liabilities), for the prosecution of productive public works.

"That

"That the debt so incurred be kept separate from the permanent or general debt of India.

"That all sums expended in the above works be treated as borrowed money, and interest charged against the work in which they are sunk.

"That whenever it is proposed to apply a part of the surplus revenue of the year to the construction of these works the following method of account be adopted:—

"(*a.*) That the sum proposed to be so expended be first applied to the reduction of debt other than that raised for public works.

"(*b.*) That the amount of the Permanent or General Debt thus nominally paid off be transferred to the capital account of those productive works upon which it is to be sent.

"That the accounts of the Public Works and Financial Department be reconciled, so that in future there may be only one accepted official account relating to productive works.

"That a full statement of the income derived from, and expenditure (both current and capital) upon these works form an integral part of the annual Financial Statement of the Government of India.

"132. To this last consideration your Committee attach great importance. The danger of raising fresh loans in India will diminish in proportion as the contribution from the general revenue of India for the payment of the interest due upon them decreases. If, year by year, this amount diminishes, and year by year the public works receipts increase, such a confidence will be established in the productiveness of these works as may induce local authorities or private individuals to undertake them without a guarantee or concession.

"133. The danger to the finances of India of the present system is, that the security for the interest upon all loans for public works is upon the general revenue of India, and not upon the productiveness of the work constructed. Your Committee are unable to suggest any other means of counteracting this vicious tendency other than the recommendations they have already made.

"134. The impolicy of raising loans in this country for public works in India is more than ever apparent to your Committee. Yet the difficulty of enforcing this regulation is very evident from the evidence of Sir Thomas Seccombe, who states that notwithstanding the great reluctance of the Home authorities to borrow here, yet the force of circumstances has been so strong that since 1873-74 out of loans amounting to 31,877,279 *l.*, 10,990,779 *l.* only has been raised in India, the remainder, 20,886,500 *l.*, having been obtained in England. Of this sum, 4,500,000 *l.* was for the redemption of certain East Indian Stock, making a total addition to the public debt of over 27,000,000 *l.*

	£.
The expenditure upon famine relief during the same period was	14,487,827
Upon productive public works	25,341,076
£.	39,828,903

the difference between the sum borrowed and expended being met out of revenue and the cash balances.

"135. The difficulties of the past six years have no doubt been abnormal, the famine expenditure in India having at times so depleted the cash balances as to render them insufficient to meet the drafts of the Secretary of State, whilst the exchange difficulties prevented the Secretary of State, at other times, from obtaining purchasers for his drafts upon India, although there were the requisite funds in the treasuries there.

"136. Your Committee, whilst making allowance for these difficulties, desire to express their emphatic opinion that loans for public works in India should not be raised in England.

"They concur, therefore, in the communication of the Secretary of State to the Viceroy, in which he requests that, whenever it is possible, a certain portion of the Famine Insurance Fund should be remitted to this country, to enable him to reduce the obligations which he has incurred here to meet famine expenditure in India.

"137. Your Committee have not inquired into the various harbour or port improvements effected with borrowed money, for they would have involved an inquiry into engineering details and plans which they did not consider it necessary to make; they recommend, however, that all money advanced for harbour or other works which any local government may wish to undertake with money raised on loan, be shown as advances repayable in the accounts, and that no such advance be made unless interest upon it be guaranteed by the local government requiring it.

"138. A suggestion was made to your Committee that a body analogous to the Public Works Loans Commissioners should be established in India to make advances to local authorities and municipalities. As your Committee have ascertained that the only resources from which these advances could be made would be the cash balances of or

loans raised in the name of the Indian Government, they are not disposed to make any recommendation by which any portion of the control now exercised by the Finance Department over those funds should be invested in other hands.

"139. The existing establishment of Europeans in the Public Works Department in India are, in the opinion of your Committee, unquestionably too large for the work they have to perform, and the heavy cost of their maintenance reduces largely the profits otherwise attributable to the works with which they are connected.

"140. Your Committee therefore recommend that an immediate reduction take place of the number annually sent out from Cooper's Hill, as well as of existing establishments in India, and that the Natives of India be more largely utilised than before.

"141. Summarising their recommendations, your Committee are of opinion,—

"That the expenditure from loans on Public Works may be continued to an amount not exceeding 2,500,000 *l.* per annum ;

"That all loans for public works be raised in India ;

"That all works upon which borrowed money be expended be included in the category of extraordinary or productive, and interest charged for the whole sums expended upon them ;

"That the annual accounts giving the results of this expenditure be completed and filled up so as to show the whole cost, including a share of general establishment charges and superannuation allowances ;

"That an immediate reduction be made in the Public Works Establishments.

"142. In making those recommendations, your Committee have avoided laying down any but general principles capable of easy application, for they have no wish whatever to interfere with the functions of the Indian Executive, upon whom the responsibility of adjusting details according to changing circumstances, and to the varying requirements of different localities, must primarily rest.

"143. Your Committee gladly take, in concluding their Report, an opportunity of expressing their appreciation of the great value of the evidence given before them, the careful arrangement of the masses of figures by General Dickens, as well as the thorough knowledge and preparation exhibited by him and other witnesses, which tended greatly to shorten and elucidate the complex inquiry your Committee were directed to make."

DRAFT REPORT read a second time, and considered paragraph by paragraph.

Paragraph 1; *agreed to.*

Paragraph 2.—Amendment proposed, in line 4, to leave out the word "investment" in order to insert the word "outlay"—(Mr. *Sampson Lloyd*),—instead thereof :—

Question, put, That the word "investment" stand part of the paragraph.—The Committee divided:

Ayes, 9.	Noes, 4.
Mr. Agnew.	Sir George Campbell.
Mr. Hardcastle.	Mr. Fawcett.
Mr. Ashbury.	Mr. Onslow.
Mr. Ernest Noel.	Mr. Sampson Lloyd.
Mr. Edward Stanhope.	
Mr. Childers.	
Sir Joseph M'Kenna.	
Mr. Balfour.	
Mr. Grant Duff.	

Amendments made.—Paragraph, as amended, *agreed to.*

Paragraphs 3—31, *agreed to.*

Paragraphs 32—33, *disagreed to.*

Paragraph 34.—Amendments made.

[Adjourned till Thursday, 12th June, at Half-past Twelve.

Thursday, 12*th June* 1879.

MEMBERS PRESENT:

Lord GEORGE HAMILTON in the Chair.

Mr. Ernest Noel.	Sir George Campbell.
Mr. Childers.	Sir Joseph M'Kenna.
Mr. John Cross.	Mr. Agnew.
Mr. Sampson Lloyd.	Mr. Hardcastle.
Mr. Fawcett.	Mr. Mulholland.

Paragraph 34, further considered, and *agreed to.*

Paragraph 35.—Amendments made:—

Question put, That this paragraph, as amended, stand part of the proposed Report.—The Committee divided:

Ayes, 6.	Noes, 4.
Mr. Hardcastle	Mr. Ernest Noel.
Mr. Agnew.	Mr. Sampson Lloyd.
Mr. Childers.	Sir George Campbell.
Mr. Fawcett.	Mr. Mulholland.
Sir Joseph M'Kenna.	
Mr. John Cross.	

Paragraphs 36—59, amended, and *agreed to.*

Paragraph 60, *postponed.*

Paragraph 61, *agreed to.*

Paragraphs 62—64, *postponed.*

Paragraphs 65—95, *agreed to.*

[Adjourned till Thursday next, at Half-past Twelve.

Thursday, 19*th June* 1879.

MEMBERS PRESENT:

Lord GEORGE HAMILTON in the Chair.

Mr. Grant Duff.	Sir George Campbell.
Mr. Sampson Lloyd.	Mr. Childers.
Mr. Onslow.	Mr. John Cross.
Sir Joseph M'Kenna.	Mr. Fawcett.
Mr. Ernest Noel.	Mr. Hardcastle.
Mr. Ashbury.	Mr. Balfour.
Mr. Agnew.	Mr. Edward Stanhope.

Paragraph 97, *disagreed to.*

Paragraph 98:—

Question, That this paragraph stand part of the proposed Report.—The Committee divided:

Ayes, 8.	Noes, 4.
Mr. Agnew.	Mr. Ernest Noel.
Mr. Balfour.	Mr. Fawcett.
Mr. Ashbury.	Mr. Onslow.
Sir George Campbell.	Mr. Sampson Lloyd.
Mr. Childers.	
Sir Joseph M'Kenna.	
Mr. John Cross.	
Mr. Grant Duff.	

Paragraphs 99—101, *agreed to.*

Paragraphs 102—103, *postponed.*

Paragraph 104, amended, and *agreed to.*

Paragraph 105.—

Amendment proposed in line 1, to leave out from the word "Railways" to the end of the paragraph, in order to add the words: "hitherto incurred has been, on the whole, beneficial to India, both on general grounds, and as affording the best security against famine; for, while many previous famines have afflicted great parts of India, history shows no case in which the food supply of the whole continent of India has been seriously deficient, if only the means of transport and distribution be available. They consider it to be shown that many of the earliest irrigation works in the most favourable situations (most of which were undertaken by native governments, and developed by the British Government) have been eminently beneficial to the country, and that all over the country vast numbers of small works of irrigation, undertaken by communities and individuals, have been equally successful; but that in a large proportion of the greater irrigation works more recently undertaken by the British Government, the cost has been so great, compared to the immediate advantages, that it is still very doubtful whether these latter works can be considered reproductive and beneficial. They have not been able to obtain sufficiently detailed information regarding the great harbour and other works constructed with money borrowed on the credit of the revenues of India, those works having generally been entrusted to local governments, municipalities, and port trusts, to whom the money borrowed by the Government of India was advanced by way of loan; and many of these works are still so incomplete that it would be difficult to judge of the result; but so far as they can learn from the evidence before them, it appears that some of these works have been successful and remunerative, while in other cases the result is doubtful.

"The only other form in which money has been largely borrowed for public works is where municipalities have raised loans in the open market for purposes of municipal improvements. These loans are, it is believed, almost entirely confined to the three presidency towns, where great works have been undertaken by this means; but we have not thought that we could extend our inquiry to these works.

"Looking to these results, your Committee are of opinion that the railway system of India should be again carefully scrutinised, and that any additional lines which may reasonably be expected, in the light of the experience now gained, to be directly remunerative, should be undertaken, the money being borrowed for the purpose. They think that the more recent experience of great irrigation works points to caution on that subject, and that it would therefore be well to watch further the results of the works already in progress before very largely extending works of this class. At the same time your Committee think it of great importance that in the higher and drier provinces measures should be taken to facilitate the construction of small local works of irrigation in the manner indicated in the 97th para. of this Report. In the less level parts of the country experience has not been favourable to the attempt to create cheap water communications, and it seems to be principally in the flat and deltaic districts that such works can be undertaken with advantage.

"Seeing the generally local or provincial character of the harbour and other works to which reference has been made, your Committee think that, as a rule, they should only be constructed when some local guarantee for a reasonable return on the capital expended can be obtained.

"The population of the presidency towns and other municipalities, is, as regards its European element, of so floating a character, and, as regards its native element, is yet so little educated in political affairs, that in the opinion of your Committee a very careful supervision should be exercised by the Government over the borrowing powers of these bodies.

"No doubt among works of all classes there may be some which are likely to be extremely beneficial to the country without being directly remunerative. Especially in regard to works of irrigation, it was at one time considered that the immense effect of great works of this kind in saving the country from famine, might justify their construction even when the direct return is comparatively small. The inquiries of your Committee tend, however, to show that the protection from famine afforded by works of irrigation must always be to some degree local and partial, while any failure of such works in extraordinary seasons may be very disastrous. On the whole, then, considering the uncertainties that must attend the best considered undertakings, and the conditions of Indian Finance, they think it best to adhere generally to the rule laid down in 1874, that no works are to be undertaken from borrowed money unless they may reasonably be expected to be directly remunerative. They consider that to be safe such works should both return a fair interest on the money expended, and provide a moderate sinking fund calculated on the capital expenditure. As a rule, works which cannot be so classed, if constructed at all, should be constructed out of revenue. At the same time they recognise the extreme difficulty of ensuring beforehand that projects accepted as remunerative shall really be so, and they feel the necessity of very careful safeguards and restrictions

tions with a view to that end. Whatever the degree of care exercised, it must be expected that there must be some disappointments; but such a degree of stringency should be exercised in testing and checking projects that the general result, taking together those which have exceeded and those which have fallen short of expectations, should not be financially unfavourable.

"In considering the expediency of borrowing money for the classes of works above described, it must be borne in mind that the circumstances of India are at present such that private enterprise does not undertake works of the kind; and, therefore, in comparing the expenditure incurred by the Government with that in other countries we must take into account not only direct Government expenditure, but the capital invested in public works by companies and other bodies. In that view the total amount now expended in India is, after all, small compared to the enormous amounts expended in the United Kingdom and in some other countries. If such a return should be secured as to make the works commercially remunerative, it might be hoped that some railways and other works might eventually be undertaken by private capitalists. On the other hand, it is generally believed that the most economical and cheap systems of railway communication have been obtained in those countries where the Government have either undertaken the work, or at least designed and supervised it. And in the case of irrigation works, since in India the Government is not only the protector of the people, but also practically the head landlord, there are great objections to allowing the supply of water for irrigation to be monopolised by any private body. For the present, then, it seems inevitable that these works should be undertaken by or under the control of Government, and that in estimating the expenditure to be incurred from public loans, this condition of things should not be lost sight of.

"While, as above stated, your Committee are of opinion that the construction of public works in India should ordinarily be limited to works likely to be directly remunerative, they also feel that India has been so much cut off from the rest of the world by difficulties of communication, and the low value of labour and produce, compared to the prices prevailing in other countries, points so much to the advantage to be derived by the people of India from removing those difficulties, that there may be some cases in which works to facilitate communication may properly be undertaken, although the return is not direct. Seeing the difficulty of immediately raising large sums by taxation, it might be allowable to raise money on loan for such purposes, provided the projects are thoroughly well considered, and provided revenues are made securely available for paying the interest and sinking funds on such loans, either by establishing a permament surplus of general revenue (a part of which might be in some sort hypothecated for such loans), or by charging them on local or provincial rates similarly pledged for the purpose. The case of ordinary roads constructed with borrowed money in this and other countries may be instanced in support of this view. It has been sometimes attempted to raise a direct revenue from such roads in the shape of tolls; but both in India the disadvantages of that system were found to be great, and in this country also it is now generally deemed more expedient to abandon the tolls, and charge the roads on the rates. Considerable rates have already been raised in many parts of India both for local and provincial purposes, and works of undoubted utility might in some cases be advantageously constructed by loans raised on the security of those rates, provided the necessities of the future are not unduly forestalled. In that view great caution will be necessary. At the present time the general revenues of India leave no margin which can be applied as security for works not directly remunerative; and till such a margin can be established your Committee could not recommend further burden on the general revenues of India.

"In regard to any reduction of the present annual expenditure on public works, this important practical consideration must be borne in mind, that the Government have entertained a great public works establishment, and are pledged to very large numbers of public officers whom it would be impossible to dismiss without large compensation or liberal pensions. The question, therefore, must be considered, not so much with reference to the immediate circumstances of the present hour, as with a view to the determination of a permanent policy.

"Looking, then, to the vastness and the productiveness of India, to the decadence of old works and the absence of new works during several generations, and to the general success of the railway system, and of some other works undertaken in recent times, it appears to your Committee that what is required is not a rigid restriction of expenditure, but such restrictions as will secure both that the works undertaken shall be those which are most necessary and useful, and that the expenditure is either prudent in a commercial point, or covered by an adequate security in the shape of special rates and taxes. If works proposed to be undertaken do not fulfil these conditions they should not be undertaken at all. And, on the other hand, if works recognised as fit to be undertaken are to be constructed, it is better to avoid the evil of constructing them by driblets, which leads to great delay and to much loss of interest during construction.

"With respect to the prudence and profitableness of great public works, it appears to your Committee that a main cause of such failures as have hitherto

occurred lies in the too great separation of the Public Works Department of the Government of India from the civil administration. For instance, in the case of great irrigation works, it may be observed that most of these which have hitherto proved unprofitable were not demanded or desired by those interested in the localities or by the civil administrators responsible for those localities, but were, as it were, imposed on them by zealous and excellent engineer officers whose engineering knowledge was great, but who were not equally acquainted with the climatic, agricultural, and social conditions necessary to make the work remunerative. In that view it is the opinion of your Committee that greatly improved checks may be obtained by extending the system of local responsibility for future works:"

—(Sir *George Campbell*)—instead thereof:—

Question, "That the words 'and irrigation' stand part of the paragraph,"—put, and *agreed to*:—

Amendments made:—Paragraph, as amended, *agreed to.*

Paragraph 106, *agreed to.*

Paragraph 107, *postponed.*

Paragraphs 108—109, *agreed to.*

[Adjourned till Thursday next, at Half-past Twelve o'clock.

Thursday, 27th June 1879.

MEMBERS PRESENT:

Lord GEORGE HAMILTON in the Chair.

Sir George Campbell.	Mr. Grant Duff.
Mr. Onslow.	Mr. Mulholland.
Mr. Sampson Lloyd.	Mr. Ashbury.
Mr. John Cross.	Mr. Fawcett.
Sir Joseph M'Kenna.	Mr. Agnew.
Mr. Ernest Noel.	Mr. Hardcastle.
Mr. Edward Stanhope.	Mr. Balfour.
Mr. Childers.	

Paragraphs 110—112, amended, and *agreed to.*

Paragraph 113.—Amendment proposed, in line 1, to leave out from the word "clear" to the end of the paragraph—(Sir *George Campbell*):—

Question put, That the words proposed to be left out stand part of the paragraph.—The Committee divided:

Ayes, 12.	Noes, 2.
Mr. Grant Duff.	Sir George Campbell.
Mr. Agnew.	Sir Joseph M'Kenna.
Mr. Mulholland.	
Mr. Ernest Noel.	
Mr. Edward Stanhope.	
Mr. Childers.	
Mr. Fawcett.	
Mr. Onslow.	
Mr. Sampson Lloyd.	
Mr. John Cross.	
Mr. Ashbury.	
Mr. Hardcastle.	

Paragraph *agreed to.*

Paragraphs 114—116, amended, and *agreed to.*

Paragraph

Paragraph 117.—Amendment proposed in line 1, to leave out from the word "India" to the word "country," in line 4—(Mr. *Onslow*):—

Question put, That the words "where there is little or no publicity" stand part of the paragraph.—The Committee divided:

Ayes, 9.	Noes, 5.
Mr. Mulholland.	Mr. Grant Duff.
Mr. Edward Stanhope.	Mr. Agnew.
Mr. Childers.	Mr. Ernest Noel.
Mr. Fawcett.	Sir George Campbell.
Mr. John Cross.	Mr. Onslow.
Sir Joseph M'Kenna.	
Mr. Ashbury.	
Mr. Hardcastle.	
Mr. Balfour.	

Amendments made.—Another Amendment proposed, in line 8, to leave out the words "under existing rules"—(Sir *George Campbell*):—

Question put, That the words proposed to be left out stand part of the paragraph.—The Committee divided:

Ayes, 11.	Noes, 2.
Mr. Agnew.	Sir George Campbell.
Mr. Mulholland.	Mr. Grant Duff.
Mr. Ernest Noel.	
Mr. Edward Stanhope.	
Mr. Childers.	
Mr. Fawcett.	
Mr. Onslow.	
Mr. John Cross.	
Mr. Ashbury.	
Mr. Hardcastle.	
Mr. Balfour.	

Paragraph, as amended, *agreed to.*

Paragraphs 118—121, *agreed to.*

Paragraphs 122—125, amended, and *agreed to.*

Paragraph 126.—Amendment proposed, to omit the paragraph, in order to insert the following new paragraph:—"Your Committee see great objection to this proposal in the permanent charge upon the revenues of India which it involves, whereas their hope would be (and that hope is justified by the figures stated in this Report), that as the railway and other works undertaken become more and more productive, and fresh works are more carefully scrutinised than they have hitherto been, the net charge upon the revenues of India may be diminished"—(Sir *George Campbell*)—instead thereof:—

Question, That paragraph 126 stand part of the proposed Report,—put, and *agreed to.*

Paragraphs 127 and 128, *agreed to.*

Paragraph 129.—Amendment proposed, in line 4, to leave out from the word "done," to the end of the paragraph, in order to add the words, "your Committee doubt, therefore, the prudence and safety of relying only on the limit of net loss proposed by the Government of India, and think that more reliance must be placed on a careful and thorough scrutiny of the plans and estimates, and especially on a strict enforcement of the principle of local responsibility"—(Sir *George Campbell*)—instead thereof:—

Question, That the words proposed to be left out stand part of the paragraph,—put, and *agreed to*:—

Question put, "That the paragraph stand part of the proposed Report."—The Committee divided:

Ayes, 7.	Noes, 4.
Mr. Agnew.	Sir George Campbell.
Mr. Mulholland.	Mr. Sampson Lloyd.
Mr. Edward Stanhope.	Mr. John Cross.
Mr. Childers.	Sir Joseph M'Kenna.
Mr. Fawcett.	
Mr. Onslow.	
Mr. Balfour.	

Paragraph 130.—Amendment proposed, to omit the paragraph, in order to insert the following new paragraph:—"With a view to check the expenditure in the way re-

commended by your Committee, they consider that the works to be undertaken directly by the Government of India should be limited as much as possible, being strictly confined to those which are of an inter-provincial character. It would probably not be difficult to mark out the lines of railway or the deltaic canals which are still required to link different provinces together, to connect the interior with the seaports, or to facilitate communication between the most over-peopled provinces and those where population is required to develope nascent industries. The tracts where climatic conditions render the extension of irrigation works on a very large scale a very immediate question are now very limited. It is doubtful whether there is immediate necessity to undertake great new harbours or other works of an Imperial character. For the rest, your Committee are of opinion that all further extension of the system of borrowing for public works, including all branch and local railways, provincial and local canals and harbours, and other similar works, should be confined to those cases in which the projects are recommended by the local and provincial administrations concerned, and in which a financial guarantee is offered, independent of the annual grants made by the Government of India to the provincial administrations. Such projects should be very carefully scrutinised and checked by the Government of India, and should not be undertaken unless there is a complete concurrence of the local and central authorities in regard to both the material feasibility and the financial prudence of the scheme :"

—(Sir *George Campbell*)—instead thereof :—

Question put, That paragraph 130 stand part of the proposed Report.—The Committee divided:

Ayes, 8.	Noes, 2.
Mr. Agnew.	Sir George Campbell.
Mr. Edward Stanhope.	Mr. Mulholland.
Mr. Childers.	
Mr. Fawcett.	
Mr. Onslow.	
Mr. John Cross.	
Mr. Hardcastle.	
Mr. Balfour.	

[Adjourned till Thursday, 10th July, at Half-past Twelve o'clock.

Thursday, 10*th July* 1879.

MEMBERS PRESENT :

Lord GEORGE HAMILTON in the Chair.

Mr. Edward Stanhope.	Mr. Childers.
Mr. Ashbury.	Mr. Fawcett.
Sir George Campbell.	Mr. Balfour.
Mr. Onslow.	Mr. Hardcastle.
Mr. Sampson Lloyd.	Mr. Grant Duff.
Mr. Agnew.	

Postpôned paragraph 60, amended, and *agreed to.*

Postponed paragraphs 62—64, *disagreed to.*

Paragraph 131.—Amendments made.—Amendment proposed, after the last Amendment, to insert the words, "and should, therefore, for the present, be limited to an amount of 2,500,000 *l.*, as recently fixed by the Secretary of State for India in Council"—(The *Chairman*):—

Question put, That those words be there inserted.—The Committee divided:

Ayes, 5.	Noes, 5.
Mr. Edward Stanhope.	Mr. Agnew.
Mr. Balfour.	Sir George Campbell.
Mr. Ashbury.	Mr. Onslow.
Mr. Childers.	Mr. Sampson Lloyd.
Mr. Fawcett.	Mr. Hardcastle.

Whereupon the Chairman declared himself with the *Ayes.*

Other Amendments made.—Paragraph, as amended, *agreed to.*

Amendment

Amendment proposed to insert the following new paragraph:—" Your Committee while putting forward the above recommendations do not in any way wish to preclude the Secretary of State from sanctioning any proposal for the construction of works out of any monies raised by loan, which, in his opinion, are necessary for the better protection of India"—(Mr. *Onslow*):—

Question put, That this paragraph be inserted in the proposed Report:—The Committee divided:

Aye, 1.	Noes, 10.
Mr. Onslow.	Mr. Agnew. Mr. Edward Stanhope. Mr. Balfour. Mr. Ashbury. Sir George Campbell. Mr. Childers. Mr. Fawcett. Mr. Sampson Lloyd. Mr. Hardcastle. Mr. Grant Duff.

Paragraphs 132—134, *agreed to.*

A new paragraph—(The *Chairman*)—added.

Paragraph 135, *disagreed to.*

[Adjourned till Thursday, 24th July, at Half-past Twelve o'clock.

Thursday, 24th July 1879.

MEMBERS PRESENT:

Mr. EDWARD STANHOPE in the Chair.

Mr. Childers. Sir George Campbell. Mr. Fawcett. Mr. Agnew.	Mr. Hardcastle. Mr. Balfour. Sir Joseph M'Kenna.

Postponed Paragraphs 101—102, *agreed to.*

Postponed Paragraph 107, amended, and *agreed to.*

A new Paragraph—(Mr. *Edward Stanhope*)—added.

Amendment proposed to insert the following new paragraph: " Your Committee, while making allowance for these difficulties, are clearly of opinion that loans for Public Works in India should always be raised in India, unless the Secretary of State should be satisfied that the difference between the rates of interest in England and India is so considerable as to afford full compensation for the disadvantages which inevitably attend borrowing in this country. They concur, therefore, in the communication of the Secretary of State to the Viceroy, in which he requests that, whenever it is possible, a certain portion of the Famine Insurance Fund should be remitted to this country, and applied to reducing the debt raised in London for famine expenditure "—(Mr. *Edward Stanhope*):—

Question proposed, That this paragraph be inserted in the proposed Report.

Amendment proposed, to leave out from the words " your Committee," in line 1, to " country," in line 6, in order to insert the words " observe that there is a practical limit to the expenditure in consequence of the objections to going too largely into the market to raise loans. In India the borrowing power of the Government is certainly limited if operations be confined to money really found in India. On the other hand, if loans which are nominally raised in India are really supplied by English capitalists, who find the money for the purpose, the indebtedness of India to England and the amount to be annually remitted, is increased just as much as if the money were directly raised in England, or more so; the variations of exchange apart. The loss occasioned by the recent change in the relative value of gold and silver has created a feeling of uneasiness on this subject; and the political effect of too largely increasing the remittances which India is bound annually to make to England might be disadvantageous. Still it is evident that in these respects the effect would be nearly the same if money were invested by private capitalists on works in India; and it could hardly be thought desirable that India should be the only country in the world debarred for drawing for its development upon the great central reservoir of capital in England. It may be argued that if by investment of English capital the

productions of India are increased, and the increase in the export of Indian produce equals, or exceeds, the increased demand for remittances, the difficulties apprehended are avoided. On the whole, your Committee are of opinion that while India cannot be altogether shut out from the London money market, for political and other reasons, it is most desirable that any loans which the Government may find it desirable to raise should be obtained from the people of India, so far as is possible, without a great pecuniary sacrifice.

"Your Committee understand that of late years loans have been raised in India in such a way that in practice they are confined to great capitalists, who profit largely by the transaction; and of these subscriptions a large proportion really comes from the bankers at the presidency towns, and largely represents English capital; the result being that the Government pays very much dearer than if the money was borrowed in England, without obtaining the political advantages desired. Your Committee are of opinion that if money is to be continually borrowed for public works it would be well to revert to the system prevailing in former days, and to give the utmost facility to natives in the interior of the country to subscribe from time to time at their convenience. The political security thus gained would be well worth that greater costliness of the loans, for which there is no adequate return when the difference is absorbed to the profit of the European bankers.

"Only after having tried to the utmost this appeal to the native community would it be desirable to borrow English money. But in so far as money must be borrowed and cannot be obtained from India, your Committee do not see that the Indian Government can be debarred from the English money market. The only question would be whether the obligation should be incurred in gold or silver, and that is a question upon which your Committee do not feel called on to enter.

"Your Committee can, in brief, only recommend that when money is borrowed every effort should be made to obtain Indian money, and that, only failing that, resort should be had to English money"—(Sir *George Campbell*)—instead thereof.

Question, That the words proposed to be left out stand part of the proposed new paragraph,—put, and *agreed to.*

Amendments made.—Paragraph, as amended, inserted in the proposed Report.

Another new paragraph—(Mr. *Edward Stanhope*)—inserted.

Paragraphs 136—138, amended, and *agreed to.*

Paragraph 139, *disagreed to.*

Another new paragraph—(Sir *George Campbell*)—inserted.

Paragraph 140, *disagreed to.*

Paragraph 141, amended, and *agreed to.*

Paragraph 142, *agreed to.*

Paragraph 143, amended, and *agreed to.*

Ordered, To Report, together with the Minutes of Evidence and an Appendix.

EXPENSES OF WITNESS.

NAME OF WITNESS.	Profession or Condition.	From whence Summoned.	Number of Days Absent from Home, under Orders of Committee.	Allowance during Absence from Home.	Expenses of Journey to London and back.	TOTAL Expenses allowed to Witness.
				£. s. d.	£. s. d.	£. s. d.
W. Sqwerby - -	Civil Engineer -	- - -	Two - -	6 6 –	- -	6 6 –

INDIA
divided into
RAINFALL TRACTS
of approximate uniformity
1878.
From information derived from the Meteorological Department Calcutta.
Boundaries of Rainfall Tracts
Average Rainfall in inches 65
Rainfall in 1878 (where reported) 68
Reference to Rainfall Tracts
I. Western Himalaya.
II. Punjab Plains.
III. Upper Gangetic Plains.
IV. Eastern Himalaya.
V. Lower Gangetic Plains.
VI. Assam & E. Bengal.
VII. Western Bengal.
VIII. Central India & Nerbudda.
IX. Rajputana & Guzerat.
X. Sind & Kutch.
XI. Khandeish & Berar.
XII. Central Provinces (South).
XIII. North Deccan Plateau.
XIV. Hyderabad & S. Deccan.
XV. Concan & Ghats.
XVI. Malabar & Ghats.
XVII. Carnatic.
XVIII. Northern Circars.
XIX. Arakan.
XX. Pegu.
XXI. Tenasserim.
XXII. Bay Islands.
Note. This Map is given in lieu of the Map of 1872, referred to in the Report, as it contains later information.
AFGHANISTAN
BALUCHISTAN
PUNJAB
RAJPUTANA
BOMBAY
Sind
Kutch
Guzerat
Kattywar
INDORE AGENCY
OUDH
NORTH WEST PRO.
NIPAL
BHUTAN
ASSAM
LOWER PROVINCES
CENTRAL PROVINCES
BERAR
HAIDRABAD
MYSORE
MADRAS PRESIDENCY
BRITISH BURMAH
BAY OF BENGAL
ARABIAN SEA
INDIAN OCEAN
CEYLON
Laccadive Is.
Maldive Is.
Nicobar Is.
Andaman Is.
Sumatra
Himalaya Mountains
Bombay
Madras
Calcutta
Lahore
Lucknow
Allahabad
Nagpur
Rangoon
Yang-tse Kiang
Irrawadi R.
Salwen R.
Makiang R.
R. Indus
R. Sutlej
R. Ganges
R. Jumna
R. Nerbudda
R. Tapti
R. Mahanadi
R. Kistna
R. Sanpu
Brahmaputra R.
Godavari R.
Cauvari R.
Ghats
Western Ghats
I 65 68
II 22 24
III 38 36
IV 144 166
V 68 72
VI 96 132
VII 56 55
VIII 44 35
IX 32 47
X 9 17
XI 29 47
XII 49 54
XIII 28 39
XIV 25
XV 145 187
XVI 112
XVII 34
XVIII 36
XIX 193
XX 76
XXI 173
XXII 108 115

MINUTES OF EVIDENCE.

LIST OF WITNESSES.

Thursday, 6*th March* 1879.

PAGE

Mr. Juland Danvers - - - - - - - - - - - - 1
Mr. William Sowerby - - - - - - - - - - - - 14

Friday, 14*th March* 1879.

Mr. William Sowerby - - - - - - - - - - - - 21
Sir Thomas Lawrence Seccombe, K.C.S.I., C.B. - - - - - - 30

Thursday, 20*th March* 1879.

Sir Thomas Lawrence Seccombe, K.C.S.I., C.B. - - - - - - 41

Friday, 21*st March* 1879.

Sir Thomas Lawrence Seccombe, K.C.S.I., C.B - - - - - - - 57

MINUTES OF EVIDENCE.

Thursday, 6th March 1879.

MEMBERS PRESENT:

Mr. Agnew.
Sir George Campbell.
Mr. Childers.
Mr. John Cross.
Mr. Grant Duff.
Mr. Fawcett.
Lord George Hamilton.
Mr. Hardcastle.
Mr. Ernest Noel.
Mr. Onslow.
Mr. Edward Stanhope.

LORD GEORGE HAMILTON, IN THE CHAIR.

Mr. JULAND DANVERS, called in; and further Examined.

Chairman.

1. THE Committee were anxious to have your evidence upon a point upon which they considered they had not yet sufficient information. We have it very clearly in evidence that the system of construction of railroads in India through the indirect agency of the Government insuring a high rate of interest on the capital raised, was not productive of economy either in the construction or the working of those railways; and we have also had stated to us, in considerable detail, the course which the Government adopted by substituting direct agency for this indirect agency; but there is a third alternative course upon which we have had but very little evidence, and that is, whether or not it would be possible for the Government to promote the extension of railways through the agency of the companies, by guaranteeing a low rate of interest upon the capital which they raise, say, for instance, 3 per cent. As you have had great experience of the working of the existing guaranteed companies, we were anxious to know whether in your opinion such a mode of procedure would be advisable, and if it were advisable, whether you thought it would be practicable?—There can be no doubt that the great development which has lately taken place in the traffic upon the guaranteed lines would have an effect upon those who might be asked to produce money for the purpose of other works of a similar kind in India. I mean it would hold out to them the hope of getting an ulterior advantage, besides the guarantee which the Government might choose to give them; but I cannot help thinking that people in this country would not be induced to advance money for the purpose of public works

Chairman—continued.

in India at a rate below that which they could obtain from the Government of India Stocks, unless a very sure hope was held out to them that they would receive an advantage out of the undertaking to which their money was applied, more than equivalent to the difference between the interest obtainable from Indian securities and that offered. Therefore, I think the first difficulty would be to raise money in this country in the manner suggested. Then as to the advisability of it, I should think that in the present circumstances of the finances of India, it would be very undesirable to raise money here, which you could possibly raise in India. I may here observe, that under the present system of provincial public works in that country, the very plan which you have hinted at has been recommended by the Government. It was proposed that the local Government should induce people in the neighbourhood who were interested in the development of a particular district to advance money upon terms which included a guarantee of a moderate rate of interest by the Supreme Government. The security was to take the shape of a debenture upon which the rate of interest was stated, and upon which it was also explained that the holder would receive half of the surplus profits after the Government were recouped what they had advanced for interest. That was the proposal of the Government in India; but the Secretary of State thought that it was unadvisable even to adopt the guarantee system to that extent if it could be avoided, and suggested that at any rate in the first instance, an attempt should be made to induce people to advance money without any guarantee of interest, and to

Mr. *Danvers.*

6 March 1879.

Chairman—continued.

depend simply for dividends upon the value of the undertaking into which they were ready to embark their money.

2. What rate of interest did the Government propose to guarantee?—The rate was to vary, but 4 per cent., I think, was the rate upon which the proposals to which I allude were based.

3. Do you know in what year that proposal was made?—It was made in the course of last year.

4. I presume therefore you cannot inform us whether or not any considerable sum has been raised in any locality in India for the construction of such works without a guarantee?—I am not aware of any case in which money has been so raised.

5. Of course just now the exchange is so uncertain that it might be difficult to form companies without a high guaranteed interest; but, assuming that this exchange difficulty will either be overcome or considerably diminished, you are still of opinion that it would not be possible to raise any considerable sum in the way suggested?—It would of course help the matter if the exchange were just in the opposite direction to that in which it stands at present, that is to say, if the price of silver went up very much.

6. Then your other objection is that you think it unadvisable, if it can be avoided, to raise further capital in England for the construction of those works?—I do, unless the circumstances are very exceptional. As a rule, I should say that it would be unadvisable to increase the charge in England on account of the government in India.

7. Still, of course, if this system could be to any extent adopted in India and the money raised there, that would dispose of this particular objection?—Quite so.

8. Personally, had you any objection to the proposal of the Indian Government?—*No*, it seems to me a judicious and practical one; but if the alternative can be carried out, it would be better still.

9. The objection, I assume, which was raised on behalf of the Secretary of State, was an objection emanating from the Financial Department?—The objections, I presume, made chiefly on financial grounds. Perhaps I might be allowed to express in his own words what the Secretary of State did say. The Despatch is dated the 31st July last. After alluding to the various arguments put forward, he says, "It appears to me therefore that in all schemes for carrying into effect the policy of constructing works of public utility by the application of local capital, assisted by loans from the Government, no such loans should be granted except as part of the general scheme of your Government for the construction of public works during the year, and I deem it essential that no authority should be given to provincial Governments to enter on any productive work of which the amount of charge proposed to be granted as a loan from the Government has not been provided in the general budget, as any other course may involve your Government in liabilities for which no adequate forecast or provision has been made. I am not satisfied, moreover, of the necessity of resorting, for the purposes of these works, to the plan of Government guarantee, which, I need not remind your Excellency, has been admitted to be no longer generally suitable to the circumstances of the country. At all

Chairman—continued.

events, I should desire, in the first instance, to try the experiment of raising local capital on the exclusive security of the success of the works, giving to the subscribers every possible interest in the management, and every inducement to economical administration. Not until this has been shown to be impracticable would I have recourse to a system of guarantees which is now wholly abandoned in respect to Imperial works."

10. Will you hand in that Despatch?—I will. (*The same was handed in.*)

Mr. *Childers.*

11. I do not quite understand the ground upon which you have quoted that proposal of last year, which was made after this Committee had sat, as an objection to the suggestion which the noble Chairman has made. The proposal last year, if I understand it, in that Despatch from which you have just read an extract, was to this effect: that the local Government of India should, by loans, aid companies prepared to construct certain public works, and that those loans should be granted at 4 per cent. In that, is there any real correlation with the suggestion of the noble Chairman that English companies should be offered the construction of railways in India, not by means of loans, but by means of guarantees, to the extent of something under the percentage which would raise the money absolutely; the difference being provided by the prospect of the good returns of the work. Without explanation I do not quite see that the two plans have anything to do with each other?—I alluded to the proposition of the Government of India in replying to the latter part of the noble Chairman's question, in which he asked me if I thought it expedient or advisable to adopt a course which would involve a guarantee of money in this country, and, as an alternative, I mentioned a plan which had been recommended for pursuing a similar course in India. The two courses were so far parallel that although as you say the money is in the shape of a loan, yet it is guaranteed by the Government of India, and is applicable to a particular work.

12. Then I will take you back to the proposal which the noble Chairman made, quite independent of this other negative plan upon which the Government of India and the Secretary of State do not agree. I will ask you this: first of all, with your knowledge of the facility for raising money in England, and I will go to the policy of that afterwards; do you believe that there would be, in certain cases, any practical difficulty in raising money in England for the purpose of constructing railways in India on a guarantee, that guarantee only going, say to 3 per cent., the subscribers being allowed to receive any surplus profits absolutely, or any surplus profits modified, perhaps, by conditions of partial or entire repayment of any advance of money which the Government have made. You are aware that money is easily raised for Indian railways now at 4 per cent.?—I think it possible that money might be raised in this country at 3 per cent. for a railway in India, but, as far as my experience goes, I should expect that the circumstances must be very exceptional to induce people to advance money at that rate, and that the amount so advanced would be very limited.

13. I will put a more exact figure; suppose a railway were contemplated, the just expectation of which was a return of 5 per cent., do you conceive

Mr. *Danvers.*

6 March 1879.

Mr. *Childers*—continued.

conceive that it would be difficult, practically, to raise the money for that railway with a Government contract of 3 per cent.?—I am afraid that it would.

14. I will go a little further, and suppose that the just expectation was 6 per cent., do you think it would be difficult, in that case, to raise the required money in India with a Government guarantee of 3 per cent. and the surplus profits?—The higher the rate of profit expected, the better would be the chance of obtaining money.

15. You have had more experience, probably, than any man in England of raising money for Indian railways; from your knowledge do you believe that if a railway were reasonably expected to give a return of 6 per cent., there would be any practical difficulty in raising that money upon a guarantee of 3 per cent. and the surplus profits?—I should say not, provided the expectation were pretty sure.

16. You say it might be difficult if the expectation of profit were only 5 per cent., but you think it would not be difficult if it were 6 per cent.?—I think any investor would require a margin which would cover the chance of disappointment.

17. That being so, take a railway the just expectation of which was a return of 6 per cent.; assuming that that money could be so raised on a limited guarantee of 3 per cent., do you see any advantage in the Government, as such, undertaking the construction of that railway as compared with its construction being undertaken by a public company?—I think that the employment of the agency of a company has many advantages, and I am not prepared at this moment to say that the Government department in India are so well capable of managing railways as a company would be.

18. First, with reference to construction, would you, from your great experience, say that a private enterprise was likely to construct less efficiently than the Public Works Department of the Government?—When you say "private enterprise," I assume you mean with a limited guarantee. I should have more faith I confess in a work undertaken by a company under the supervision of the Government at the present time, than I should in a work undertaken exclusively by the Government.

19. Would not the fact of the guarantee being to an amount less than the normal rate of interest on money in the market, be a certain guarantee for economy in construction?—I am hardly prepared to say that, because the company and the Government would be so closely connected that the Government practically would have the control over all expenditure, and should check anything like extravagance.

20. But taking into consideration that their control may be more or less efficient, would it not *à priori* be a guarantee for economy that the company being only assured by Government a small rate of interest would do its best to keep down the expenditure?—Yes, *à priori* it would.

21. Has it not been stated, with more or less justice, that the very fact of companies being able to get a guarantee of 5 per cent. upon their capital has tended in the direction of their being a little easy about the capital expenditure in past years?—It has been so said.

22. That being so, I will pass from construction to maintenance and working; you have seen a great deal of the operations of these companies, do you think the Government are more likely to work a railway efficiently than a company?—I do not.

Mr. *Childers*—continued.

23. Therefore, on the whole, you look to advantages both in respect of construction and in respect of maintenance, and working rather on the side of their being entrusted to a company than their being entrusted to the Public Works Department?—Yes, I do.

24. Then I will carry you a step further; you have given the Committee valuable evidence as to the disadvantage of raising more money than can be helped in this country; is that disadvantage at all modified by the consideration that this money so to be raised would be raised at the expense and for the benefit of individual proprietors in the companies, rather than of the Government?—I think it would be advisable to raise money in India rather than in this country; but, of course, it would depend upon the terms upon which you could raise money in the two countries respectively.

25. You do not object, I assume, to any amount of mercantile capital being raised in this country for employment in India?—Not at all.

26. The mere fact of a certain number of merchants using English capital in India is of advantage to India, quite irrespective of the circumstance that the interest of that capital in some shape has to be remitted from India to England?—Quite so.

27. The objection to English capital being employed, under Government guarantee, is an objection in connection with the large Government remittances for interest?—Yes.

28. If the capital employed upon these railways were capital employed by, and interest to be remitted to, private persons by the Government to a certain extent, the objection to the balance to be remitted on the public account would cease?—It would.

29. Therefore, as far as the objection to raising capital in England as compared with India is concerned, the fact of railways being constructed in the main at the risk of individuals, would modify the general objection to remittances from India to this country, would it not?—Certainly.

30. I suppose you will admit, after the experience of the last few years, that it is not possible to raise, except to a very limited extent, money in India at anything like the rates at which money can be raised in England for the purpose of works, the return upon which is uncertain?—I am not prepared to say that.

31. Do you mean to say that Indian capital is satisfied where the return is speculative, with the same rate of interest as English capital is satisfied with?—No; but I presume the Government had fair ground for proposing that 4 per cent. only should be given for money advanced upon public works the other day.

32. You are now referring to a Government security, but I am dealing with non-government securities; can the money market in India give anything like so low a rate of interest for money the return of which is uncertain?—No.

33. Therefore, while it may be prudent to use the money market in India as far as possible for Government lines, your opinion would not at all apply to lines where the return was uncertain?—No.

34. Therefore, your answer would only apply

Mr. *Danvers.*

6 March 1879.

Mr. *Childers*—continued.

in a modified degree to raising the money where only a portion of the interest was guaranteed?—Of course to a modified degree; but I think I must say, with a considerable modification.

35. Therefore, upon all those four grounds there is a good deal to be said and heard by this Committee upon the question of the practicability of constructing railways hereafter upon a partial guarantee?—I think so.

Sir *George Campbell.*

36. Is not the practical objection to trying the plan which has been suggested to you this, namely, that all the lines of railway which are more likely to pay have been already taken up, and that it would be very difficult to put your finger upon any proposed new line upon a large scale which might confidently be expected to pay 5 or 6 per cent.?—Yes; but I presumed that the question was put to me in the abstract, and not in the concrete.

37. Looking at the map of India, is it your opinion that there are any lines of rails which could be projected and put upon the market with the assurance that they are likely to pay 5 or 6 per cent.?—It would be quite possible to find such a line, the success of which might be pretty well assured. India is a very large place, and there is room for more lines of communication which would produce a remunerative return.

38. Can you at this moment suggest any such line which might be fairly discussed in that light?—I am afraid I am not sufficiently acquainted with the local traffic or the trade of particular districts to enable me at this moment, without going into it, to answer your question satisfactorily; but I am satisfied that it would not be difficult to find out lines of shorter or longer length which could be put forward, I think, as likely to earn 5 or 6 per cent. with good management and proper economy.

39. But it is the case, is it not, that by far the most likely of the Great Trunk lines have been already taken up?—Yes, no doubt.

40. I would ask what is the condition of the question as to the proposed line of railway from the Deccan to Carwar, and whether that, in your opinion, would be a paying line?—The line under consideration at the present time is one from the Decçan to Marmagoa, north of Carwar, on the same coast. The present position of it is that it has been offered to a company who required no guarantee, and who have still two or three months remaining, during which they are to make up their minds as to whether they will continue to carry it out.

41. Who are the promoters of that line?—Mr. Frederick Campbell was the chief promoter. I think in my last evidence given before this Committee I described what had been done.

42. Will you tell the Committee whether the reports regarding the Harbour of Carwar are promising?—I have not seen any recent reports respecting that harbour.

43. What is the condition of the line to Goa?—That is the line I was talking of; the line to Carwar has been in a measure supplanted by the proposed line to Goa.

44. Are the physical features of the Goa line superior to those of the Carwar line?—Not that I am aware of.

45. What are the considerations then which have nduced the Government to support the Goa line,

Sir *George Campbell*—continued.

terminating at a harbour not in our own territory, in preference to the Carwar line, with a harbour in our own territory?—The promoters of that line asked different terms; they did not require a subsidy, and were content with the grant of land and other facilities.

46. Then it is not in contemplation to promote the Goa line as a subsidised line?—Not as a subsidised line.

47. Then, if as my question infers, the principal Great Trunk lines have been taken up, have you been led to believe that short branch lines might be made which might be likely to pay?—Certainly.

48. I think there was some obscurity in the terms upon which the Muttra line was made; might I ask you to explain those terms to the Committee?—That line was conducted on the provincial system, the Government guaranteed 4 per cent. upon the money advanced by the holders of debentures.

49. Upon the whole money?—Yes.

50. Supposing there is a profitable excess over the 4 per cent., what is done with that?—That is divided between the Government and the proprietors.

51. Can you answer in any greater detail the question which you answered by a general affirmative just now, when you stated that you thought there were many small branch railways which might be profitably made; can you point to particular parts of the country where you think such small railways might be made?—There are a variety of instances where the junction of a railway with a town a few miles from it, would bring to the parent line great traffic, and would also pay a very fair interest upon its cost; but I should prefer before I gave an opinion upon any particular scheme, to have an opportunity of examining it and looking into it.

52. Then putting aside entirely the question of lending money by the provincial Government, is it your opinion that in the case of small lines situated under circumstances similar to those under which the Muttra line was constructed, it be possible to raise local funds for the construction of those railways, funds, perhaps, to a considerable degree contributed by local people interested in the construction of these lines and supplying funds either without a guarantee, or upon a small per-centage guarantee, such as has been suggested by the noble Chairman?—Yes, I do.

53. Has it been the result of your communications with officers in India, that they are very sanguine that that could be done?—I have seen the proceedings which embrace the opinions of men who are able to judge, and I have also seen the schemes which the Supreme Government have proposed in the way of developing certain districts, and they are all guided by the conviction that these branch lines will be profitable in themselves, and confer great benefits upon the districts in which they are constructed.

54. But my question was this, whether you think that local capital could be raised for their construction, either without a guarantee, or with a small guarantee?—I could not be certain in such a matter until an attempt was made; but my opinion is that it would be successful to a limited extent.

55. You say that you have seen several schemes of this kind which the Government of India

Sir *George Campbell*—continued.

India have taken in hand; will you tell the Committee in what terms it was proposed to take it up, whether with a guarantee, or without a guarantee?—I think that in every case the Government of India have felt that they would be unable to raise the necessary funds without the promise of interest upon the money advanced without, in fact, some guarantee. There was a considerable scheme proposed for the provinces of Rohilkund and Oudh, comprising branches here and there to connect the principal main lines in that country, and in those cases the Government proposed that the money should be raised from people in the locality who were interested in the development of the country, but they always proposed to grant a guarantee to pay the interest upon the sum so advanced.

56. At what rate was the guarantee?—Four per cent. was the rate generally mentioned.

57. Has it never been proposed in any case to offer a guarantee of less than 4 per cent.?—It has been suggested that 3½ per cent. might be a sufficient guarantee, but I do not think it has ever been tried.

58. Supposing a system of this kind to be possible in a good many cases, do you think that in the case of small local lines it would not be possible with advantage to look to the English money market, but that you must look to the local money market to get the money?—It must all depend upon the terms upon which you could raise money there and here; if you could raise money only at 6 per cent. there, and at 3 per cent. here, it would be to the advantage of the undertaking to raise the money here.

59. But from your knowledge of the state of the market in both countries, and considering that while on the one hand interest on money is rather dearer in India, and that on the other hand, in the case of these very small local railways, people at a distance of many thousand miles might be less willing to advance money than people acquainted with the local requirements; I would ask, with your great knowledge of the subject, whether you think we could more advantageously look to England, or to local capital in India, for the raising of the necessary funds?—I am decidedly of opinion that it would be much more desirable to raise money in India for these purposes.

60. And also you think it would be more practicable?—And also, I think, at the present time it would be more practicable to meet the requirements of the case.

61. I think you stated, in reply to a question put to you by Mr. Childers, that supposing the money raised in this country, the interest of which must afterwards be remitted from India, were raised, not as a Government fund, but as a private fund, the objection to the increase of the drafts upon India would, to a great extent, disappear; but is it not the case that the necessity for private drafts upon India, for private remittances from India to England, must affect the market almost as much as Government drafts, and must in that degree indirectly affect the Government drafts?—That is quite true, but, at the same time, I do not think we should object to that if pure private enterprise were applied to India, that is to say, if money were raised in this country by independent parties for the development of the resources of that country.

62. I think there was some little doubt raised by two successive answers which you gave to

Sir *George Campbell*—continued.

Mr. Childers. Mr. Childers asked you whether, in your opinion, the working of railways by private companies was more advantageous than the Government working them; and I understood your answer to be, "I do not know." Then, when Mr. Childers put the question to you more categorically, "Is it not more advantageous?" I think you said "Yes." I should just like to understand what is your opinion upon this question?—I do not recollect giving these answers. My opinion is, talking of the present time, that it is more advantageous to employ the agency of companies for the working of railways in India.

63. First, as regards the construction; it is not now a matter of theory altogether, but a matter in regard to which there has been considerable experience. We know that great lines of railway have been constructed by guaranteed companies, and we also know that very considerable lines have been constructed by Government, although in the case of the Government lines they are principally narrow guage lines. But I will ask whether, as the result of the experience we have already had, the construction of lines by Government has been cheaper or less cheap than of those constructed by private companies, the character of the work being taken into consideration?—I think, before answering that question, it is necessary to remind the Committee that the companies were the pioneers of railway construction in India; and of course when works of that kind are novel much more expense is incurred than when you have gained all the experience of years: and moreover the difficulty of transporting materials in early days, from one part to another, was so great, that it added 1,000 *l.*, or perhaps 2,000 *l.*, a mile in some cases to the cost of the line; but, taking the present time, I do not see why there should be any difference in cost between a line undertaken by the Government or by a company. It all depends upon the people who are employed in its construction.

64. Perhaps, with regard to the working of railways, you will tell us in a brief form what are the points in respect to which you think the working by companies has the advantage over working by Government?—In the first place, companies will manage a concern of that kind on commercial principles. There is always the apprehension that a Government may be swayed by motives and influences to which Government administrations are often subject to depart from these principles, which are, I think, the correct ones for railway management. A Government system is apt also to tend towards centralisation and over regulation, whereby individual responsibility is interfered with, and a restraint is laid upon that personal interest and zeal which is so necessary to secure the successful management of a railway. A company avoids these tendencies.

65. Since you were last examined before the Committee, is it not the case that a very marked new departure has been proposed in regard to the management of the East Indian Railway, the practical effect of which I understand to be that the Government becomes for the most part the proprietor of the line, but the working is to be left to a company for a long period of years?—Yes, that is so.

Mr. *Childers.*

66. Do you think it would be as easy to transfer the management of a railway constructed by

Mr. *Danvers.*

6 March 1879.

Mr. *Childers*—continued.

Government to a private company coming to it fresh, as to retain the management of a railway constructed by a company in that company?—I think it would be quite easy to transfer a railway which had been constructed by the Government to a company to work it, if that is the meaning of your question.

Sir *George Campbell.*

67. Supposing the Government in any case should decide to purchase a railway, but to leave the management in the hands of a private company, will you tell the Committee what, in your opinion, is the best mode in which the management of that company could be established, and its system carried out?—I think that it must all depend upon circumstances, upon the character of the company, and the way they had managed the railway before, and so on.

Mr. *Childers.*

68. If you transfer to the management of a private company a line either constructed by the Government itself or under Government supervision, which you have just said could be transferred with equal facility, what should be the new conditions of management and of Government control over that management?—I should say that the Government in the first instance should endeavour to secure such a system of management as would produce success; that they should hold out the hope of profit to the managers or contractors, and that their control should be such as should not interfere with the responsibility of individual officers, but that it should be so exercised as to produce energy and zeal on the part of those engaged in it. At the same time they should arrange to secure to the Government a very considerable share of the profits.

69. Will you tell the Committee how you would propose to constitute a body of management for such a company; how would you appoint the body of directors; how would you obtain a board for your management?—I am to suppose the line is finished and ready to be worked, and that the Government are desirous of having it managed economically and efficiently. I should either prefer to see it placed in the hands of a body of managers nominated by the Government, if you please, but independent of the Government in a great measure, who should be provided with principles and rules for their guidance, but who should after that be left to manage to the best of their ability the concern committed to their charge; or I would propose to transfer the line to a company who should pay for it, and who should either undertake to manage it on their own account entirely, or, if necessary, should be assured a certain amount of interest upon the capital they advanced, and a further amount in the event of success attending their own management, still retaining to the Government the greater share of the profits.

Sir *George Campbell.*

70. I understand you to say that you would either, by retaining the property in the Government, appoint a body of managers nominated by the Government, or, on the other hand, you would offer the property for sale to a new company supplying the capital, who, having an interest in the concern, would manage it under the influence of self-interest; can you suppose any intermediate course in which, the Government owning the property, there should still be some sort of company entrusted with the management; and, if so, how would you constitute the board of management in such a case?—It must either be managed by Government, directly, that is to say, by a body nominated by the Government, or by a company in a measure independent of Government; I confess that no other course occurs to my mind at the moment.

Sir *George Campbell*—continued.

71. How are the directors of the present guaranteed companies appointed?—They are elected by the proprietors of the company, that is to say, by the shareholders.

72. Do the proprietors usually take much interest in that election?—No, I should say not; after the first board has been elected, the selection is generally left to the board itself; if a vacancy occurs the board elects a director to fill that vacancy.

73. Practically, is there, to any extent, any canvassing among the shareholders for the place of director of that company; is there a popular election to the extent which occurs in some of the English railways, as, for instance, in the South Eastern Railway Company recently?—None whatever. The shareholders have always the opportunity of confirming or not the selection made by the directors at the general meeting, when they go out by rotation; they can either re-elect them, or elect others in their places.

74. But practically there is none of that independence which exists amongst the shareholders of English railways?—As a rule shareholders do not exercise an independent power; but the practice is, I believe, the same in both cases. Exceptions may occur in each.

75. Then may we say that in the event of vacancies the directors are practically appointed by the existing directors altogether?—Yes.

76. What is the nature of the Government control which you would desire to retain in case the Government should desire to engage the services of the companies for the purposes of management?—I would retain a control over expenditure, and over certain proceedings; but I should prefer not to exercise minute control unless the necessity arose.

77. Would you make any such provision as that in the case of a great military or political crisis it should be in the power of the Government to take the management entirely out of the hands of the company to which it had been entrusted?—Certainly, in a case of emergency.

78. Let me ask you this; do you think that this system of self-appointment by the directors of the guaranteed railways is a good and safe system, or do you think that in the course of time it may lead to a kind of close corporation and other abuses?—I have not found it to be so; I think generally the selections have been conscientiously made, and are good.

Chairman.

79. Has the Government any control over the appointment or selection of directors?—No, I should say not. It is true that the Government director at the boards has a veto over every proceeding at the board, but this is so much a shareholders question; representing, as the directors do, the shareholders interests, as distinguished from the Government interests, that I think it would be almost improper for him to interfere in the matter, so as to prevent the proper exercise of

Chairman—continued.

of the rights given to them by their Acts of Incorporation.

80. You would have a veto, but would not exercise it?—I have never exercised it in such a manner, and I should very much hesitate in doing so. Indeed, I should doubt whether I had legal authority to exercise a veto on such a question as that.

Sir *George Campbell.*

81. Supposing that it should ever happen that the Government are dissatisfied with the management of any particular guaranteed railway, and think that the existing directors of that railway are not managing it in a way satisfactory to them, do you think there are existing means by which the Government could obtain any change in the management of that railway either immediately or upon the occurring of vacancies?—They could use their moral pressure, of course; but the theory is that these boards should be in a measure independent of, and yet in co-operation with and under the control of, Government.

82. Supposing it should ever occur that the board of a particular company were suspected of jobbery or mismanagement, and the Government wished to remedy that evil, seeing, as you have told us, that practically up to the present time, the boards are self-appointed, and that in the event of vacancies occurring, the existing directors appoint the new directors; do you see any means by which in case of such evils creeping into the management, the Government could meet them?—It would be certainly the duty of the Government director to check anything like jobbery or mismanagement, or improper proceeding of any kind; he having power to veto any act of the boards, except that of communication between them and their legal advisers, and should at once bring his influence to bear.

83. But except by the exercise of the veto of the Government director, you have no means by which the Government could remedy the evils arising from the creation of a close corporation by one of those railway companies, with the action of which the Government might at any time be dissatisfied?—The Government have control over the purse, and could stop the salaries; it is only by the sanction of Government that a certain amount of money is allowed annually for the payment of directors, and that the Government could stop if they were dissatisfied with their conduct.

Mr. *Ernest Noel.*

84. One of your schemes was that managers should be appointed by Government, but should be left somewhat independent. What would be the inducement to those managers to conduct the railway upon the most economically commercial principles?—Simply a sense of duty.

85. What control do you propose that the Government should have over them in a case like the employment of natives. Supposing they did not see their way to employing native engine-drivers, and it was thought by the Government that it would be better, as a general principle, to employ native engine-drivers rather than Europeans, would you give any control to the Government in a question of that sort?—The Government would always have the power to express their views and opinions, and such a commission, no doubt, would regard it as their duty

Mr. *Ernest Noel*—continued.

to consider with favour anything coming from the Government, and in that way moral pressure would be brought to bear upon them; it would all depend upon the constitution of such a body; but the probability is that in forming any plan power would be reserved to the Government to insist upon a policy being carried out which they thought would be for the interests of the railway and of the country.

86. Would you give the same power to the Government in cases where the railway was handed over to a new company, which was your other proposition?—Yes, I would.

87. All the managers would have a self-interest in managing the railway economically, as they would be sharers in a certain portion of the profits?—Certainly.

88. Suppose those profits fell below the guaranteed profits, and were not likely for some time to rise, do you think there would still be sufficient inducement for them to manage economically?—That I can hardly say; the probability is that no body of capitalists would produce money for the purpose of these works, unless they could retain the opportunity of giving them up in the event of their failing to obtain such a success as they expected.

89. If they did not get something over 4 per cent. they would be in a position to return the undertakiug to the Government?—If they only got something under 4 per cent. they would expect to have an opportunity of giving up the concern.

Mr. *Agnew.*

90. On the question of native labour and general control, would you think it good policy that the Government in the exercise of their contról should insist upon a certain proportion of native skilled labour being used upon the lines of railway?—If the Government had grounds for supposing that a certain proportion of native labour ought to be employed, I think they would be perfectly right in requiring it to be done.

91. You mean if they had grounds for believing that a certain proportion of equally good skilled labour could be found among the natives as is is now found among the Europeans, chiefly in the direction of engine-drivers?—Yes, it would be a question of economy. Native labour is cheaper than European, and therefore if there were any power of interfering with the management of the railways the Government ought to have the power of interfering in that case.

92. Is it your opinion that native engine-drivers are equally to be trusted with Europeans?—I cannot say that they are to be placed upon a par with them at present, but it is a question of training, and I do not see why, in time, natives should not be excellent engine-drivers.

93. Upon the question of the election of directors in the railway companies, and when vacancies occur, their being filled up by the existing directors until the next general meeting, those appointments you tell us are confirmed by the shareholders, or are generally acquiesced in, proving that the shareholders are satisfied with them; is not there just the same mode of election in all companies; even in the Bank of England is not the process of election there just the same, namely, that the directors recommend, and the body of shareholders confirm?—I imagine so; my experience does not lie in other companies; but I believe that is the usual course.

Mr. *Danvers.*

6 March 1879.

Mr. *Agnew*—continued.

94. I wish to ask you this question upon another point, namely, upon the question of the Government offering a smaller guarantee than has hitherto been offered to railways; if the first expectation of profit to be made in India upon a railway should be 6 per cent. or more, is it your opinion that a guarantee of 3 per cent., or even less than that upon the capital, would practically make much difference in the facility of raising the capital?—I think that capital might possibly be raised under such circumstances; of course it could be raised with greater facility if a higher rate of interest were guaranteed.

95. What I wanted to put was this, if the first expectation of profit was to amount to 6 per cent., or something like that, would a guarantee to half that amount practically make much difference in the raising of the capital?—Yes, I think it would make a great difference.

Mr. *Hardcastle.*

96. Am I to understand from your evidence that it is your opinion that the Government would be justified in supposing that they would secure a more economical and more honest management at the hands of a self-appointed body of directors than at the hands of a commission appointed from their own officers?—No, I do not think they would secure better and more honest work out of the self-appointed than the nominated body.

97. I understand you to admit that the directors are practically self-appointed now?—Yes.

98. Then, what is the nature of the advantage which is secured by the anomalous system which has been proposed, of a nominally independent body of self-elected directors?—That is the system that has been pursued all along; the directors of the railway boards have generally been elected by themselves.

99. But I am contemplating a complete change in which those directors are managers of the lines for the benefit of the Government, instead of being managers of the lines for the benefit of the company?—Do I understand you to ask me whether I prefer a board consisting of self-elected members or of members nominated by the Government?

100. Yes, I do?—I think, upon the whole, I should prefer a board representing a constituency having an interest in the success of a line.

101. If those self-elected directors are liable to the interference of the Government in such matters as the appointment of natives as engine-drivers, would you think that they would still have sufficient independence to give them adequate control over the interests of the line?—I think, in practice, they would; because we find the Government does not interfere in these matters, unless it is found to be necessary; all nominations up to this time have been left in the hands of companies. The appointment of all their officers, and their dismissal as well, has been left in the hands of the companies.

102. Do not you think that the same advantage would be secured, for instance, by the retention of the chairman and one or two of the most active directors, at a salary, and perhaps a commission, upon the improved working of the lines, rather than by their being self-elected?—I do not think that a reduction in number would make any difference in the efficiency of their management, supposing that those selected were qualified.

Mr. *Hardcastle*—continued.

103. But would you not by a simpler and more reasonable practice secure the same management, if you secured the same persons?—Yes, no doubt.

Mr. *Onslow.*

104. How far is the line finished towards Peshawur from Lahore?—As far as Jhelum.

105. A steady progress is being made with that line?—I do not think it is very much advanced; surveys have been made, and the line is being staked out, but I do not think its construction has proceeded very far.

106. Can you tell the Committee what the estimate is for the current year for that line?—I have not seen it; all these estimates are in India, and we have not seen them at present.

107. Have you any estimate in your office for the bridge across the Attock?—The first proposal for getting across the river was by a tunnel, but that was abandoned, and I am not sure that any scheme for a bridge has been seriously under consideration. The estimate for the bridge is 30 lacs of rupees.

108. Still it is the intention of the Government of India some day or other to complete the line to Peshawur?—I presume so.

109. And that will necessitate a bridge across the Attock, will it not?—Yes.

110. If that had been done in former years, would it not have been very advantageous in carrying grain up to the Rajah of Cashmere's territory, in mitigation of the famine at the present time?—Probably it would, but the greater portion of the grain would have been taken up this side of the Indus.

111. Do you know any spot between Rawul Pindee and Peshawur, where an advantageous light line could be made to the Rajah of Cashmere's territory?—I am not personally acquainted with the locality.

112. At the same time you advocate the construction of these light lines all over India, do you not?—I think it is very advantageous to construct branch railways (where such branches are required) in the lightest and cheapest form you can.

113. In answer to Sir George Campbell, you stated that you preferred the system of raising money locally for the construction of these light lines?—Yes, I did.

114. Are you aware of any part in India where money could be raised locally in that way?—I think in various places it might be done.

115. Do I understand you to mean that the money to be raised locally would be subscribed by the different rajahs and persons through whose land the line passed?—Yes, quite so; the money would be provided by rajahs and persons interested in the country and the produce.

116. Have any representations been made to the rajahs about these light lines?—They have had the opportunity of knowing that they can advance money for the purpose; I do not think that any special applications have been made to any particular rajahs or landowners; but some have volunteered.

117. And been accepted?—And been accepted under certain conditions.

118. Are you aware whether the natives of India are investing more money in railway securities now than in former years?—I do not see any tendency that way; that is to say, not as holders of shares of Indian railway companies.

119. Is

Mr. *Onslow*—continued.

119. Is it not natural to suppose that if money is forthcoming locally according to your opinion, more money would be invested in Indian railways?—I cannot explain why there has not been a larger amount invested by natives in Indian railways, except that the interest is payable in this country, which is not convenient to them, and although registers have been established in India, yet there is the difficulty of exchange, and one thing and another which has militated against it.

120. Do you think the principal reason is that the interest is payable here and not there?—That has, no doubt, had something to do with their abstention.

121. If stronger inducements were held out to natives to invest money for the construction of these lines, do not you think that more money would be forthcoming?—Yes, if stronger inducements were held out.

122. Will you tell the Committee what inducements are at the present time held out?—The utmost that has been proposed at present has been to pay them four per cent. upon the money they advance, with a prospect of a share in the profits of the undertaking with which they may be connected.

123. But they are not to manage the line in any way?—It would be desirable to introduce that element, no doubt, and it would probably be allowed if no guarantee were required from the Government, but when once a guarantee is given by Government, control and supervision on the part of the Government become necessary.

124. Do you think that the rajahs would be more inclined to make railways if there were no guarantee, and if they had the management of the line in their own hands?—No, I do not think so.

125. That is the mode in which the Hyderabad line has been constructed, is it not?—No, the Hyderabad line has been constructed by the Nizam himself, under the direction of officers of the British Government; he produced the whole money for the purpose.

126. And has the management of the line, has he not?—He has the management of it, but there is a stipulation that it shall be managed to the satisfaction of the Government by Government officers.

127. You have referred to the very important question with respect to the employment of native engine drivers; is there any school established in India at the present time for teaching natives to drive an engine?—Their school is the workshop of a railway in which natives are trained, and are gradually brought up to understand the management of a locomotive engine as well as its mechanical intricacies.

128. But no general system is established?—At Roorkee, and colleges of that kind in India, natives have the opportunity of studying mechanical engineering, but they would be of a superior class to that which would furnish engine-drivers.

129. Could you tell the Committee how soon it is proposed to complete the Indus Valley Railway?—The Indus Valley Railway is now completed, with the exception of the bridge over the Indus at Sukkur, and that work is now under consideration. Being a very important engineering work it will require a great deal of consideration before it is put in hand.

Mr. *Fawcett.*

130. As far as I understand, the arrangement which you have mentioned is this, that when a guaranteed railway came into the possession of the Government it should be owned by the Government and managed by a company of private individuals?—That is so.

131. What restrictions would you place upon the directors of that company with regard, for instance, to the business in which it might be engaged?—Restrictions similar in character to those which have been imposed upon guaranteed companies up to this time.

132. If the railway, after it became the property of the Government, were managed by officials connected with the Government, the general regulations of the service, if not more precise regulations, would prevent those men from engaging in private trade, which would bring them into conflict, as it were, with the company?—Yes.

133. For instance, you being an official of the Government of India, you would not become engaged in business on your own account; you would not go into the manufacture of engines or into private trade?—No.

134. Would there be any security that, under your arrangement, some of your directors, being self-elected, might not be large iron masters, or shipowners, or manufacturers of the very material which the railway company have to purchase?—I should think, if nothing else did, that their deeds of settlement would preclude their entering into a business of that kind with the company while they held the office of director.

135. But not under the present system, or under the system you propose?—Under the present system I think no director could make any contract with a company in which he was concerned.

136. But that is not my point; there is nothing to prevent the directors of the East India Company to-morrow electing a large shipowner?—No.

137. And nothing to prevent their electing a large iron master?—No.

138. No more there would be under the system which has been suggested, that a railway which was owned by the Government of India should be managed by a board of directors similar to those who manage the guaranteed railways at the present time?—Certainly not.

139. Then you would remove, would you not, one very important guarantee for judicious administration, seeing that these directors may have an interest opposed to the economical management of the company?—I should not apprehend any difficulty in that respect.

140. But still, as a matter of fact, for instance, you may have three large shipowners, who although they might not take freights themselves, might feel it rather advantageous to maintain the rates of freights; and their interest in maintaining a high rate of freight would be much larger than would be their interest in the economical management of the company, after it had passed into the hands of the Government, as a property?—I should expect there would be sufficient check upon any such improper motives.

141. I would not say it was an improved motive; but it is found necessary in the Civil Service to prevent men who are engaged in that service from trading upon their own account. For instance, such a thing as a man holding a high

Mr. *Danvers.*

6 March 1879.

Mr. *Fawcett*—continued.

high position in the Indian Civil Service being partner in a firm at Bombay or Calcutta would be unknown, would it not?—Certainly.

142. But you let Government property be managed by people who could trade on their own account, under the suggested new arrangement, to the detriment of the interests of the company of which they were directors?—I should provide checks certainly upon their trading in their own interests.

143. What check would you provide?—I think the check which already exists would be sufficient, which prevents the director of any company engaging in any trade or making any bargain with the company, so long as he is a director of it.

144. I know that a director cannot make any bargain with a company, but I understood you to say, in answer to a question which I put to you just now, that there is nothing under the present system to prevent a gentleman who is a director of one of these guaranteed companies, from carrying on trade at the same time on his own account, though there is a regulation of the company to prevent him trading with the company; you stated, for example, that there was nothing to prevent a large ironmaster being elected a director; now I ask you, would you propose any new restriction besides those which formerly existed?—I would simply have the restriction which still exists, and which is exercised by each director's own colleagues. I think that ordinarily among a body of gentlemen who take seats at these boards, there is a high moral tone, which would prevent any really bad influence from being exercised.

145. But if that general prevalence of a high moral tone were sufficient to secure economical administration, it would equally apply to the Civil Service, would it not; although in that case we have distinct regulations to prevent a man entering into trade. Do you consider that the prevalence of that high moral tone would prevent a director from being influenced by the considerations of benefit to the trade in which he was engaged?—But now, as I understand, you are referring to a man taking or not taking any particular course, because doing so might improve his own business.

146. Not quite so; he might not consciously be influenced by personal motives, but a large ironmaster might be influenced by the general benefit of the trade. Though a large ironmaster, being a director, might not be going to sell a large quantity of iron to the company, yet a large order for iron might benefit the trade generally, and he might be unconsciously influenced by a consideration of that kind, though he might have no direct dealing with the company?—That would practically be prevented by the system which exists, namely, of resorting to competition for the supply of materials.

147. But, as I understand, the directors do not resort to competition, and the Government do not compel them to do so. I do not understand that you advertise for the lowest possible tender to take your goods?—Our rule is to advertise and to invite tenders.

148. But it is a rule which has not been very strictly observed, is it not?—It is generally very strictly observed; but there are exceptions to rules, and sometimes cases occur when it is unnecessary, and when economy is better secured by avoiding public competition.

149. Under the present system can you say that half the stores of the guaranteed railways were purchased after open competition?—I should say nine-tenths of them were.

150. Do you say that from official returns?—I could show it by official returns.

151. Then with regard to freights; does the same observation apply?—Freights are a different matter, and although competition is frequently resorted to with regard to freights, it is not infrequently found in practice to be inexpedient to do so.

152. I am not inquiring into the system now; I have no doubt it may be inexpedient, but as a matter of fact, with regard to one very important branch of expenditure, namely, the question of freights, which is a matter in which shipowners are largely interested, open competition is not the rule, but the exception?—Open competition may not be the rule, but prices are obtained from various parties who are known to be in a position to offer freights, and the more favourable arrangements are made.

153. What do you propose to pay those directors under the system you have suggested?—I proposed nothing.

154. Supposing a line which had been constructed upon the guaranteed system, after having been the property of a company for some time, became the property of the Government, it is contemplated, as I understand your evidence, that such a railway should be managed by a private company analogous to that which owned it before; what would the directors be paid?—I suppose the usual fees that directors get, say from 150*l.* to 200*l.* a year.

155. But previously to that those directors are largely interested as shareholders; they are directors of their own property. You could not get the efficient services of gentlemen who were administering, not their own property, but the property of the Government for 150*l.* or 200*l.* a year, can you?—Not unless you introduced the element of self-interest by allowing them to participate in the profits.

156. But suppose the Government entered into an arrangement which was to last for a considerable number of years, say for 25 years, during which the line should be managed by a private company; and after this arrangement had been in operation for five years, the company were unable to pay a dividend equal to the Government guarantee, then the persons who had to manage the line for the remaining 20 years would not have the smallest interest in working it economically?—I submit that they would have the greatest interest in making it pay.

157. But supposing there were no chance of its paying, as there are many lines in England which have no chance of paying dividend upon their ordinary stock, then there would not be the same inducement to effect economy?—There would not be the same inducement, certainly.

158. They would have all the trouble, and any advantage resulting would fall to their successors; is not that so?—No doubt.

159. You think that the question of constructing railways by borrowed money is very much influenced by the present position of exchange, do you not?—I think it is to a great extent; it affects the terms upon which money ca

Mr. *Fawcett*—continued.

can be raised, especially if the interest is paid in rupees in India, and the lender is in England.

160. What I mean is, that raising money in England now to construct even the most useful public works, is a much more serious thing than raising money some years ago was?—Certainly.

161. And you think that the very serious loss which India is suffering at the present time, from the increase in the amount which is annually being transmitted from India to England, should be a material consideration in deciding whether it is wise or not to construct railways by money borrowed from England?—I do certainly.

162. In fact, it is very much more desirable now to construct railways by money borrowed in India, than it was a few years since, when this state of things had not arisen, as distinguished from constructing them with money borrowed in England?—Yes, I think so, undoubtedly.

163. When a confident opinion has been expressed as to the probability of railways paying in India, do not you think some doubt is thrown upon the trustworthiness of those calculations by the fact that practical men of business in England, who are always ready to invest their money in an undertaking which is likely to pay, steadily refuse to invest money in Indian railways without a guarantee?—Yes, I do.

164. When it is said that there is great probability, or the most reasonable expectation, that a railway which the Government are going to undertake will pay 6 or 7 per cent., if there really was this reasonable expectation, do not you think that English capitalists who show great eagerness to invest capital in every part of the world where there is the least chance of remuneration, would invest their money in India?—I am afraid not.

165. If there were a fair chance of profit, why do you think that there would be this disinclination on the part of English capitalists to invest their money in a country which is under their own Government, rather than in countries which are foreign countries?—I am not aware that any large sums have been invested in public works in foreign countries conducted by the Governments of those countries without some kind of guarantee.

166. As far as I know there is only one proposal (which is by no means likely to come to anything) of a private company undertaking to construct a railway in India on their own risk, whereas thousands of miles of railway have been constructed in South America, in the United States, and in Canada, almost entirely by English capital. The only railway I know (and that is only even in contemplation now) of whose construction by a private company there is any prospect is the railway to Goa?—That is so.

167. Have you any other explanation of that fact to give than that English capitalists look with extreme doubt upon the probability of the railways of India returning a reasonable and ordinary profit upon the capital invested?—Doubt, uncertainty, and ignorance combined, I have no doubt, have acted as a preventive.

168. You have used the word "ignorance;" upon that I would ask you is it not rather a reflection upon the intelligence of the English, or upon the method of administering India, that, while English capitalists have a sufficient knowledge of Brazil, and of Bolivia, and the whole of South America, and of remote parts of Eastern

Mr. *Fawcett*—continued.

Europe, to induce them to invest their money in railways, they are too ignorant to invest it in India?—I am not aware of the terms upon which they have advanced money for the works in those distant places, but I should apprehend that the whole thing was very speculative, and that probably those who were answerable for the interest upon the money were called upon to give very extravagant terms.

169. But then it comes to the same thing upon the whole; money flows to what is considered the best investment just as certainly as water finds its own level. Therefore we come to the conclusion, do we not, that they probably have no other motive, looking upon it as a question of trade, and desiring to invest their money to get the best return, except that they think it better to invest their capital in constructing railways in almost any country in the worl rather than in India?—I am not prepared to accept that position.

170. Has there been a mile of railway constructed in India at the present time without the artificial assistance of a Government guarantee?—Not by companies.

Sir *George Campbell.*

171. What has become of the Nulhattee line?—That line was sold by the company who made it, to the Government.

Mr. *Fawcett.*

172. That line was not constructed by a private company, was it?—Yes, it was originally constructed by a private company, and the Government purchased the line for much less than it cost.

173. You spoke just now of the Goa Railway, and spoke of it as to a certain extent a rival to the Carwar Railway; and I understood from your remarks that, if the Goa Railway scheme were abandoned, the Government might revert to the Carwar Railway; is that so?—I am not prepared to say that the Government would revert to the Carwar Railway; the Carwar Railway was proposed before the Goa line, and certain assistance was asked for the Government, but nothing was done; and while that was in suspense the Goa Railway was proposed as an independent line.

174. But even in the case of the Carwar Railway, which has been sometimes instanced as a case of a railway which has been projected by private enterprise, it was promised that assistance should be given?—It was under consideration whether assistance should be given.

175. And that assistance was upon the point of being given, was it not?—It had not gone so far as that.

176. And that assistance, if it had not been fortunately checked by a Committee of this House, would have been given to Messrs. Nicol, Fleming, and Company, whose name has recently occurred prominently in connection with the Glasgow Bank?—They were the chief promoters.

177. With regard to the native engine-drivers, I understood you to express a somewhat unfavourable opinion of them; you said that up to the present time, although you spoke hopefully for the future, they had shown themselves inferior to the European engine-drivers?—I should be very sorry if I left the impression that I thought unfavourably of natives being able to act as

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Mr. *Danvers.*

6 March 1879.

Mr. *Fawcett*—continued.

engine-drivers. The question was put to me whether I thought them equal to Europeans as a rule; at present I could not answer that question in the affirmative, but I went on to say that I thought that by training and education they would soon arrive at an efficiency which would justify their more general employment.

178. When you say they are not equal to Europeans, is that opinion based upon official reports, or upon your own personal inspection of them?—I give that opinion from official reports.

179. As far as I understand, the only official evidence that we have had has been in the contrary direction. Mr. Rendel, who is the consulting engineer to the Government, gave evidence before this Committee, from which it appeared that in some respects they were much better than the European drivers?—That is possible; in some respects they may be.

180. Let me refer you to his evidence on that point?—He was asked at Question 4060: "You said just now with regard to the employment of native drivers, that you were employing 150 this year; how many did you employ before"? To which he replied, "I think it is only within three years that we have been employing them at all. (*Q.*) And I think you said that in consequence of employing these 150 natives instead of 150 Europeans, whose place they took, there is a saving of 15,000 *l.* a year to the company? (*A.*) I think there was if the figures were taken out. (*Q.*) Therefore, according to those figures, you can get native drivers cheaper than Europeans, and each native driver that you employ represents an annual saving of 100 *l.*? (*A.*) We pay the native driver 18 rupees a month, and we certainly paid the European whom he replaced 180 rupees. (*Q.*) Therefore you paid him 10 times as much? (*A.*) Yes, fully 10 times as much, and the native does more work; he works longer hours, and he gives less trouble." Therefore that opinion is extremely favourable?—Yes, I agree with what Mr. Rendel says; I am also very favourable to the employment of natives; I have always done all in my power to encourage the employment of natives, but it is a question of time.

181. You said just now that the directors of the guaranteed railways, to whose management it is proposed to entrust the railways when they become the property of the Government, had shown great economy in their administration; if that is so how is it that for 20 years they have gone on employing European engine-drivers until within the last three years when they could have had native engine-drivers and paid them 9-10ths less?—The training of natives is necessarily a gradual process, and although efforts have been made to obtain their services more largely, a sufficient number of qualified candidates for certain places are not forthcoming.

182. But Mr. Rendel gave evidence the direct reverse of that; he said distinctly that the supply of these native drivers was practically, as I understood him, inexhaustible. Can you point to any document, or can you give any evidence whatever, to show that upon our railways, which have been in operation 25 years, the slightest effort whatever was made to employ native drivers 10 years ago?—Yes, I can.

183. Where?—I could show you that instructions to that effect have been given from this country; I could show you that efforts have been made by locomotive superintendents in India to collect intelligent natives and train them in the shops, and I could show you that the Government as well as the companies have been anxious to promote the training of the natives for these and other purposes.

Mr. *Fawcett*—continued.

184. How do you account for this fact, seeing that the native character does not change, that directly the attempt is made three years ago, they get 150 qualified natives as drivers upon a single line. Now, if those efforts that you speak of were really made in the past, how do you account for the fact that upon no one line in India was there a single native driver employed?—There is no doubt that there has been a great prejudice against the employment of natives in India as drivers; there has been a timidity and a fear of accident, and a strong opinion is still entertained by some that they might not be equal to an emergency; that they might not have the requisite presence of mind in case of sudden danger.

185. But that is quite a different reason from their not being employed, because there was a want of opportunity. I can quite understand the prejudice against them, but I cannot understand why, if in three years they have been able to get upon one line 150 native engine-drivers, they could not have got them before?—That prejudice and that feeling has had its effect, no doubt, upon some of the officials managing Indian railways, but now I think the conviction is growing that by adopting proper measures of training men can be obtained for the purpose.

186. Is it not also possible to account for it in this way, that until quite recently none of those guaranteed railways divided any profits among the shareholders, the fact being that in the meantime they were getting 5 per cent. upon all the capital they had spent, and therefore economy was not present to them as a necessity?—I do not think so. It is true that the shareholders in this country received the guaranteed interest, which was 5 per cent., but I doubt whether the shareholders as a body go much into the question of economy in management; they rely upon the boards.

187. But placing the responsibility upon the directors, seeing that during the continuance of this whole period there was, as it were, an agency ready at hand to be employed, which agency could be employed at a saving of 9-10ths in the important item of engine driving alone; do you think you could say that a body like that showed themselves very zealous in the cause of economy?—My experience would enable me to answer that question in the affirmative; I think they have been most anxious to secure economy.

188. But here is a great source of economy whereby 15,000 *l.* a year are saved in a single item, without any diminution of efficiency, and that source of economy has absolutely been neglected?—Not by them, I think. I could show that instructions have been sent out to the agents of the companies in India to do all they could in that respect.

189. Those agents they could have controlled?—Yes, no doubt; but both the Government and the railway officers have had considerable hesitation in employing natives as engine-drivers. An immense number of natives are employed upon the lines; I should say that more than nine-tenths of those employed are natives, some of them occupying responsible positions.

Mr. *Fawcett*—continned.

190. Does not that show that if this scheme of the Government owning lines, and entrusting their management to a board of directors in London is carried out, it will entrust the management to a board thousands of miles away from the lines which are in that way more or less out of their control?—But although out of their immediate supervision, they are under the control of the Government officers in India.

191. But if the line is under the management of directors, you must have one thing or the other; if the line is managed by directors, the line must be primarily under the control of the directors?—The lines are under the control of the directors.

192. But what I understand is that the fact of these native engine-drivers not being employed, and orders being constantly sent out to the directors, shows that the directors could only exercise, as it were, a limited control over their agents in India?—They have absolute control; but it is one thing to give a direction which the board here may think good policy, and another thing carrying out the policy directly and implicitly without hesitation. They do not preclude their agents from making representations to them upon matters upon which they may have expressed a strong opinion.

193. But that is only another way of saying it is a limited control?—It must be qualified in practice, as explained, but the power of the directors over their servants is absolute in giving orders, subject always to the Government control under the contract. It is thus limited.

194. And necessarily so from the long distance between the head quarters of the management, and the affairs which they have to administer?—Yes, quite so.

Chairman.

195. There was one point which I omitted in my first examination, upon which I desire to ask you a question now. At present in all the contracts which are entered into between the Government and guaranteed companies, the Government have not only guaranteed a certain rate of interest upon the capital subscribed, but have also guaranteed the rate of exchange at which that interest, so to say, shall be paid?—The interest is paid in this country in sterling, so that the question of exchange does not arise in respect of interest paid here.

196. If the proposal were ever made to raise capital in this country by a company at a low rate of interest guaranteed by the State, the first question that the promoters of such a company would ask would be would the Government guarantee the rate of exchange at which any profit over and above the guaranteed interest should be paid?—They might make that inquiry, but now, under the old contracts, there is no fixed rate of exchange for the conversion of the surplus profits (which are received in rupees) into sterling; the surplus profits due to the company are payable in India only, and they have to remit them to this country as best they can. The Government guarantee is paid in this country in sterling, and is remitted by the Government of India to the Secretary of State; all besides is payable in India, and the company remit it at the best rate of exchange they can obtain. Thus 5 *l.* per cent. is paid here. If the railway earns 7 *l.* per cent., the company's share of 1 *l.* per cent. is received in rupees in India and remitted to this country by their agents at the current rate of exchange.

Chairman—continued.

Mr. *Childers.*

197. Have the Government ever urged the companies to employ a larger proportion of native labour?—I am not aware that they have found it necessary to do so.

198. You gave two alternative schemes for the working of already constructed lines by the help of private enterprise, one which is almost governmental; that is to say, a permanent commission but not removable, and other which was purely private enterprise, that is to say, that the railway should be purchased by a private company, and that the company should then come under somewhat similar conditions to the present companies, that is to say, that its profits should be guaranteed to a certain extent, and that they should get a surplus, or a portion of the surplus, as the present plan is; but is there not a third proposition which would be well worthy of consideration, that is to say, that the railway should be leased for a term of years at a rental to a company, the company only purchasing the rolling stock, they being compelled to keep up the line in due order, and having proper conditions attached as to the conduct of their business; would not that, in your opinion, be a feasible plan?—It would be feasible.

199. Would it not altogether get rid of the liability of the Government to guarantee a certain amount of interest?—Of course it would all depend upon the terms of such an arrangement.

200. Would it not also import to the highest degree the principle of commercial self-interest, namely, economical working?—Yes, it would have that effect.

201. The capital which was risked in that case would be comparatively small, and therefore you would be more likely, would you not, to get persons ready to enter into an arrangement of that kind?—Yes, but I should be afraid of the Government losing the benefit which it ought to obtain.

202. If you could get the company to offer anything like reasonable terms for a lease of the line, the Government would be relieved from all responsibility, and you would be much more likely, would you not, to get companies coming forward under those circumstances, than if they had to subscribe the enormous capital which would be required to purchase the railway?—Yes; I should only be afraid of the terms which it might be necessary to give, being onerous to the Government.

203. When Sir George Campbell asked you whether there was any territory left in which railways would pay, and suggested that the want of such was an objection to a limited guarantee, is it not also, to a certain extent, an objection to railways being constructed by the Government, that they would be left to construct the railways which would be likely to pay least?—Yes, quite so.

Mr. *Edward Stanhope.*

204. Without going into the question of open competition for freights, is it not the case that that matter has been carefully considered?—Yes.

205. And the conclusion which has been arrived at is that it would be undesirable to lay down any hard and fast rule to apply to all cases?—Yes.

Mr. *Danvers.*

6 March 1879.

Mr. *Hardcastle.*

206. You were asked by Mr. Fawcett whether it was not a matter of reflection upon the English Government of India that English capitalists were willing to lend money upon railways in Brazil and Bolivia, and some similar places, rather than for the making of railways in India. As a matter of fact, has there been any difficulty in obtaining money for the making of British railways in India under Government guarantee?—Not in the least under Government guarantee, but Mr. Fawcett meant without a Government guarantee.

207. But are you not aware that the railways in Brazil and Bolivia were made under Government guarantee?—I felt pretty sure that the terms which had been given to those parties were probably more extravagant than those which the Government of India had given in the shape of guarantee, but I was not sufficiently acquainted with the subject to say so distinctly.

Mr. *Onslow.*

208. I think I understood you to state in reply to Mr. Fawcett, that you think the East Indian Railway is at present economically managed?—Yes.

209. Do you think that has been the case ever since its formation under a guarantee?—I think the management has improved, and that experience has led to increased economy in various ways.

210. Do you know that a Committee of which Colonel Chesney was Chairman was appointed, and the evidence given before that Committee showed that about four millions were supposed to have been expended without any vouchers whatever?—I do not think that was made as a charge of extravagance, but to show that the accounts had not been properly kept.

Mr. *Onslow*—continued.

211. The evidence showed that the money was needlessly expended, did it not?—No, I do not think so; there were doubts as to what account the money should be charged to; but I do not think it came out in the end that there was any needless or extravagant expenditure.

212. Assuming that that money, for whose expenditure there was no voucher whatever, had been expended, are you still of opinion that the East India Railway could be said to be economically managed?—That applied more to construction than management; it was capital expenditure, and if I remember rightly it was simply a question of account. The construction, no doubt, was very expensive, but that arose, in great measure, from circumstances over which the company had no control; and, as I said before, the novel nature of the undertaking when they commenced, the difficulty of conveying their plant and stores up the country, added immensely to the cost; and then the Mutiny broke out, which was the cause of wasting three million of money.

Sir *George Campbell.*

213. Is it not the case that the East India Railway has the best levels in the world, and that the haulage is the most favourable in the world?—No doubt the East India Railway is most favourably situated.

Mr. WILLIAM SOWERBY, called in; and Examined.

Mr. *Sowerby.*

Chairman.

214. I THINK you are acquainted with the terms of the Reference, and also with the general nature of the evidence, which has been given before this Committee. You have, however, I believe, had a somewhat exceptional experience of India; would you state to the Committee what your connection has been with India, and also with the construction and carrying out of public works?—I went out to India in 1854, as assistant engineer upon the East Indian Railway. I was engaged for some time in that work in making surveys and such like. I then was employed by the Government in making a survey of the mineral resources of the lower part of the Himalayas. I made that survey and reported, and then I took charge of some experimental works for the manufacture of iron in India; that extended up to about 1861.

Sir *George Campbell.*

215. Where was that?—In Upper India. After that I was engaged in Madras as a contractor. I was engaged also in making a survey of the different ports and harbours around the coast of India, and I was for nine years the Local Funds engineer in Surat and Broach; that extended up to 1874. Since 1874 I have been in India as a contractor, and during my career I have seen most of the public works in Europe; I have visited them as an engineer from time to time, and I have also seen and travelled over considerable parts of India examining the public works with which I had no direct connection.

Chairman.

216. So that we may say that you have had constant and continuous experience for the last 25 years of public works in India, and that you have been engaged in various capacities?—Yes; latterly I have also had connection with some of the cotton factories in Bombay, of which I was a promoter and shareholder, and I have had connection with them in their management.

217. The terms of the Reference, as you are aware, mainly refer to the policy of constructing public works with money raised on loan. Those works are almost exclusively irrigation works and railways; you have had some experience of both, and I believe also that you have some knowledge of the difficulties which the Indian Government experienced in the earlier stages of the development of public works in raising the capital?—Yes; in 1847 I was acquainted with the early promoters of Indian railways. At that time it was proposed to carry out railways in India; and, among others, Mr. Chapman, Mr. Macdonald Stephenson, and Mr. Mackay were sent out to India on behalf of the cotton merchants of Manchester. The cotton merchants of Manchester were anxious to have cotton brought from the interior more cheaply to the coast; they desired to have railways down to the coast, and the best plan they thought would be to send out their own agent to investigate to some extent the feasibility of making railways in India. Then the question arose with reference to raising the capital; at first it was proposed to commence with short lines, and to give concessions

Chairman—continued.

sions to certain mercantile firms in Calcutta and Bombay. The firm of Messrs. Cockerel and Company, which failed in 1847, were intended to have the first concession for the Bengal Railway; they came unfortunately to a sudden smash; and in 1847 great financial difficulties occurred in England, and the making of railways was delayed for a considerable time.

218. What occurred afterwards?—The difficulty of raising capital was very much discussed, but financial difficulties occurred here (I daresay some of the Members of the Committee will recollect the financial difficulties of 1847) and so matters went on until 1850, and then the East India Company were gradually induced to guarantee certain main lines in India. About that time Lord Dalhousie went out as Governor General, and he was urged to have these main lines constructed, and the only way of raising the capital at the time was by means of a guarantee.

219. Have you had any personal experience as to the result of constructing railroads in India by guaranteed capital; and, if so, is it, in your opinion, a costly or an economical system?—The guarantee system, I think from the first, was a mistake. If the Government had made a short line, say from Calcutta to the coal fields (as the old Stockton and Darlington line was made from the coal fields to the seaboard), and that line had paid a handsome per-centage, as it might have done, then. I think it is probable that the whole of the lines in India might have been made without any guarantee. The first difficulty was, that they launched out in making a very extensive line before they had had any experience in making a short piece.

220. Now we have had returns furnished to us of all the capital which has been expended in making railroads both by the Government and the guaranteed companies, and, with very few exceptions, they give a fair return; do you think it is likely, even if the first railroad paid in India, that companies would have been eager to promote them all over India, unless they found they paid, as a general rule?—The one difficulty with regard to India is this, that the country in which the people are expected to invest their money, is a country in which the inhabitants have no voice in the Government; it is a despotism; consequently you must have, for certain Imperial works, some kind of guarantee from our Government. There is no country in Europe which has raised money, except upon a certain guarantee from the Government, for Imperial works. The large main lines of India are Imperial works; they are not commercial lines, but they are necessary for Imperial purposes as well as commercial purposes, and being Imperial works, they should in some respects require a Government guarantee.

221. I will put the question in another shape; your previous answer rather seems to infer that if the construction of railways had been left to private companies, without a guarantee, the construction would have been so much more economical, and the working so much more satisfactory, that there would have been a certain profit or return upon the works?—Yes, certainly; but for any public works of any description, whether railways or docks, I do not think you have any right to expect a clear interest of more than 4 or 5 per cent. I doubt whether any works in this country pay more than 4 or 5 per cent.; if they pay more than 4 or 5 per cent., and they are works which affect the trade or commerce of the country, then the proper thing is to reduce the tolls or charges for the use of the work, so as not to let it pay a higher per-centage; 4 or 5 per cent. is a very good per-centage in my opinion for every description of public works.

222. Do you think that at present, or during the past two years, it would have been possible to raise any considerable sum of money for the construction of railroads in India without a guarantee?—I think if the early railways had shown a better return, and had not been upon such a gigantic scale as they have been, they would have been able to raise capital now without a guarantee, or upon a smaller guarantee than has been given, a guarantee probably of 3 per cent.

223. You heard the evidence of the preceding witness?—I did.

224. Do you think now it would be possible to raise capital upon the suggestions which were thrown out by the last witness?—I think it is possible to raise capital for certain lines, not for the large Imperial lines extending from one end of the country to the other; but for small branch lines or feeders, I think it is quite possible to raise money without a guarantee to anything like the amount that has been given formerly.

225. You have had some experience as a contractor, I believe?—I have.

226. You think that it would be quite possible even now to make a considerable number of feeders upon the smaller lines in India through the agency of private companies with a low Government guarantee?—With a low Government guarantee certainly, but not for the construction of very large and extensive lines; I think that such a line as that spoken of from Bellary to Goa or to Carwar might be made without a guarantee, or possibly upon such a guarantee as 3 per cent., or possibly the Government might lend the company a proportion of the money to carry on the work at 3 per cent.

227. Have you seen any of the State railways which have recently been made?—I have seen none of the State railways which have recently been constructed.

228. Therefore you cannot give the Committee any opinion as to what will be the financial result of the policy of constructing railways by the State?—The probable results of the lines are well selected, will be, of course, a moderate return of profit upon them. If the lines to be constructed are mere feeders, I think the outlay must be very moderate indeed, because there is some misapprehension as to the extent of feeders which are necessary. I think good common roads are as a rule all that is necessary in many parts. I know in Guzerat several small lines were proposed there which had not the smallest chance of paying; for example, lines leading from the Bombay and Baroda Railway, either to the right or left. The line from Broach to Ahmode was calculated to pay about 1½ per cent., and the company were very anxious to make it, but there is a good road which answers all the purposes.

229. There has been, as you are probably aware, considerable agitation in Bombay to induce the Secretary of State to sanction the construction of that railway upon the broad gauge?—Quite so. I think the introduction of the narrow gauge is quite a mistake, either on branch

Mr. *Sowerby.*

6 March 1879.

Chairman—continued.

or main lines; its introduction upon any part of main lines is simple insanity, I think.

230. Upon what grounds do you base that opinion?—Because a light railway upon the broad gauge can be constructed almost, if not quite, as cheaply as the narrow gauge of 3 feet 3, the metre gauge. My experience goes back a very long distance in railways. I was connected with the old Stockton and Darlington Railway, and they first began their line with a light rail of cast-iron. I remember those rails myself. They were then replaced by a light wrought-iron rail of 35 lbs. to the yard, and they gradually improved the line, taking up the lighter rails and laying down heavier ones, whereas if they had had a narrow gauge, and had had to widen it, they could not have done that without interfering seriously with the traffic. Then the lighter rails were taken off and laid down upon branches of the same line, and the same plan, in my opinion, should certainly be followed out in India, because many of these lines which the Government may construct will in time, in all probability, become main lines, and not remain merely feeders.

231. But admitting the necessity of economy, you think as an engineer that a gauge which has been recently adopted is too narrow?—The gauge which has been recently adopted is too narrow; the origin of the gauge of railways is very simple; if you put two animals in the front of a carriage the width between the middle of their backs is 4 ft. 8½ in., as nearly as possible; in fact, you may take it as being the natural gauge everywhere. I think the gauge which was introduced into India was also a mistake; it was the Irish gauge, and the Irish gauge arose in a discussion about the time of the battle of the gauges in this country, when it was a question of 7 ft. or 4 ft. 8½ in.; and the Irish Commissioners put the two figures together and split the difference, and got a result of 5 ft. 6 in.

232. What do you consider the prospect of fresh railroads in India; do you think the returns will gradually increase from the older railroads, and that there is any fair prospect of building new lines that will prove remunerative?—I think there are some new lines that might be opened out; there are many districts in which a light cheap rail could be introduced with advantage. I will give the Committee an example of a case in which, I think, a great mistake was made in a line which I know perfectly well, the Nizam's Railway; it was made for about 9,000*l.* or 10,000*l.* a mile; I know the country perfectly well, and I think a light railway might have been made to accommodate all the traffic upon that line, on which there are not more than two trains a day, for about 5,000*l.* a mile, whereas it cost 9,000*l.* or 10,000*l.* a mile. Although the district through which the line runs is miserably poor, the stations are little palaces; the fact is, that the line has been made regardless of expense, and I believe it is carried on at the present time at a dead loss of 80,000*l.* a year to Sir Salar Jung, and the Nizam. If that line had been made at 5,000*l.* a mile Sir Salar Jung could have continued his railway system, but being made at that immense cost it cannot be continued. The consequence was, that Messrs. Fleming came up with their narrow gauge system to introduce it over the country, instead of continuing the existing gauge. I was up in the Nizam's territory at the time, conferring with Sir Salar Jung, and I strongly

Chairman—continued.

advised him to do nothing of the kind; to introduce no break of gauge throughout his territory, as it would be a bad example. But that shows a case in which an expensive line was introduced, the consequence of which was to stop the extension of railways throughout the Nizam's territories.

233. Who was the engineer who constructed that line?—The Government engineer.

234. And the money was provided by the Nizam's Government?—Yes.

235. Now, leaving the subject of railways, and coming to that of irrigation, I think you have had considerable experience in the construction of irrigation work as a contractor?—I have seen a good deal of irrigation works. I have done a great deal of work which had reference to irrigation. When I had charge of Local Fund works in Surat, all the wells and tanks in the district were under my charge. I have seen many of the irrigation works in India, such as the Ganges Canal, and all that system which is common throughout the whole of Southern India. I have seen the works in Poonah, and I have seen also irrigation works in Italy. I went specially to examine those works.

236. You have been through the Madras Presidency, have you not?—I have been through the Madras Presidency, I lived there two years.

237. We have had some very valuable evidence given by a Member of the Committee, Sir George Campbell, which is confirmed by various Reports and statements which have been laid before Parliament, showing that there are certain portions of India which are more liable, on account of want of rain, to famine than other parts, and probably that part of India which is most liable to scarcity is, as you know, a portion of the Deccan and a very large part of the Presidency of Madras; in fact, the districts which were recently visited by famine during the last two years. I shall be glad if you will tell the Committee what class of irrigation works you think ought to be constructed there, taking into consideration both their financial returns and also their utility in preventing or mitigating famine?—If you attempt to provide sufficient water for irrigating the greater part of India, and especially that part of the country which you specify, I think you would find that it was utterly impossible. One inch of rainfall is equal to 100 tons per acre. If the monsoon fails no power on earth could ever supply that quantity of water over any great area. If there are any irrigation schemes which can be made profitable they must be placed along the valleys of the rivers. In the Madras Presidency they have a number of tanks, but many of them are very old: and again up in Poonah and the higher parts of the Deccan and Hyderabad, which abut on rivers, they have made large tanks; there are two of the largest I ever saw in the neighbourhood of Hyderabad, which were built about 100 years ago, and they are amongst the finest works in India. Those tanks irrigate large tracks of land down the valley. The Poonah work is also intended to irrigate, but it is differently situated altogether from what the Hyderabad works are; it is also in the upper part of the valley, but it is led off up the side of the hill, and then gradually finds its way into the low country and will be utilised for irrigation; a very small part of the water is yet used. You cannot introduce irrigation

Chairman—continued.

irrigation into a district suddenly, it is always a work of time. General Cotton's idea of introducing it largely, and spending 10,000,000*l.* annually upon it, is a mistake in my opinion, because even if you could spend that money, you could not get cultivators to undertake the cultivation; and I apprehend that one of the difficulties experienced in Madras has been to get people to take the land, because there is much more labour required to work irrigated land than ordinary land. In Guzerat, after some land had been reclaimed from the sea, it was very difficult to get people to come and settle down and cultivate the land; it required some time, and consequently if any gigantic scheme such as General Cotton proposes were carried out, I think the difficulty they would find would be to get people to use the water, and to cultivate with it.

238. In this part of Madras in the Deccan to which I have alluded, there are very few rivers whose sources could be depended upon, if the annual rainfall were to fail?—There are very few rivers in Deccan but what become perfectly dry if there is no rain; even the Taptic, a large river, becomes perfectly dry about the months of April and May, and you can ford it in almost any part which is not subject to the tide.

239. Therefore it would seem almost impossible to construct large irrigation works such as there are in upper India, because there are not a sufficient number of rivers the supply of whose water can be depended upon; and we have also had it in evidence that to attempt to construct to any great extent railroads through a very considerable part of the Deccan could not possibly prove financially a success, on account of the poverty of the people; therefore it seems that the most feasible method of securing this part of India from the recurrence of famine, is to construct smaller works, such as tanks, which should retain the rainfall of the preceding year; have you had any experience of this class of work?—I have had experience of this kind of work on a small scale in Guzerat, and I have seen many of those large works in the Deccan. In my opinion, the only plan which could possibly be adopted successfully, would be to carry out small works of that description, by bunding up and making artificial reservoirs so as to supply as much water as possible; but in any case it would not be possible to supply the whole country with water if the monsoon fails; works of that description, I think, should be carried on entirely by Government, and never placed in the hands of a company; all irrigation works are so mixed up with questions of land, that the intervention of any company would be a great mistake; I have been recently over in Spain, and I found very much the same thing there; moreover, I think the irrigation department should be made a separate department of Government, and as the natives of India are particularly adapted for engineers in that particular branch of the service, they should be specially retained for that particular service; I doubt whether you can get Europeans in any part of the world who have had special training for that branch of work; you may get them for railways every day, but not for irrigation works; then their pay must be small, otherwise your works would be most expensive, as considerable numbers would be required. There must be a certain amount of European general supervision, but as a rule, the whole of the irrigation works should be in the hands of Government, and be carried out by native engineers.

Chairman—continued.

240. With regard to the works which you have undertaken or contracted for, what class of men did you employ?—In the Surat and Broach districts, where I was for nine years, I had nothing but native assistants; I did every kind of work with native assistants. I made about 350 miles of road and bridges; I constructed some very large bridges, both of stone and iron. I have the plan of a bridge here which was constructed entirely by natives (*producing a photograph*).

241. Had you no European supervision?—I had no European supervision whatever; I had one or two Europeans to begin with, and I was very glad to get rid of them. I never found them so efficient as the natives; they were not very satisfactory; they gave me a great deal more trouble than the natives did. The assistants I had came from the Engineers' College at Poonah; they were just passed out, and had had a tolerably good education; they were good draughtsmen and understood the use of the level, and, after a little training, they understood how to put up bridges and do every kind of work which I had.

242. Supposing you had any fresh contract to carry ont, you would not hesitate to almost entirely trust to native labour and supervision?—I would have nothing else; I would employ natives exclusively; there is no kind of work they cannot do; I have employed them upon bridge building and upon engineering work. I had some cotton factories to manage, and I had nothing but natives to attend to the machinery, and they did the work quite as well as any Europeans could do it.

243. Were the men you employed in supervision men of any experience?—They had been trained at Poonah College, and got a little knowledge there; some had been trained upon the railways, and some in the factories at Bombay; but the assistants I had upon the public works, and the local funds works, were entirely youths from the college at Poonah.

244. So that you have no doubt that with the facility which the Government have for promoting scientific education amongst the natives, and establishing engineering colleges, they could, in future, very much rely upon native talent for the conduct and execution of irrigation works?—I do not think, as a rule, that engineers require such a very high amount of scientific education as is generally considered necessary. I think it is a mistake to send them to a college at all. I was never sent to a college. From my youth I was brought up upon works, and though I have been professor of mathematics and engineering at a college, and am therefore a good mathematician, yet it is very rarely that engineers require very high scientific education. I think it is a proper thing to give them a good plain education, but one month on practical works is worth twelve months at a college. You cannot make engineers at any college. You must employ them upon works. You might as well send a man to a college to teach him to be a shoemaker. You might teach him all about leather, but you could not teach him how to make a shoe.

245. Then, as I understand, you would advocate in the southern part of India the erection and construction of small irrigation works for the

Mr. *Sowerby.*

6 March 1879.

Chairman—continued.

prevention of famine?—I would not recommend exclusively the construction of small works, but small or large just as the circumstances suited.

246. I rather assumed that in this particular part of Madras and the Deccan, large works were hardly possible?—There are no doubt some places where large works are possible. That work at Poonah is a large work, and again down the Taptie the irrigation scheme there would be a large work. It would not be so large a work as the Ganges Canal, which is supplied by the melted snow from the mountains, and is therefore a stupendous work.

247 In the south of India we may take it for granted that it would never be possible to construct irrigation works upon the same scale as those which have been constructed in the north?—Never, it will be quite impossible.

248. If therefore the works are to be of less magnitude and consequently less expensive, how would you propose to carry them out; do you think you could get them executed through village communities by the inhabitants themselves, or do you think it would be necessary for the Government in every instance to take the initiative, and do the whole work themselves?—You can get the natives to do a little themselves upon a very small scale. In Guzerat, for example, I used to get the villagers to subscribe so much for the repair of their tanks, provided the Government would give so much out of the local funds; the Government assessed them at one anna upon their rental, and having agreed upon the proportions, the villagers sometimes would undertake the work; sometimes they would not give the money, but they would undertake to do a third of the work; and at other times they would not undertake the work, and I had to get outside contractors to come in; but whenever the villagers do work they do it proportionately much more cheaply than when the labour is provided by the Government.

249. But there is a great difficulty in a village obtaining the money from the local funds for a local work, is there not?—I do not think the Government are generally very generous; on the contrary, they are rather apt to encroach on the local funds; just before I left India there was an entire change in their system. In consequence of the immense influx of young engineers to India, they could not find employment for their staff, and the consequence was that they had to seize all the local funds in order to keep their engineers' staff occupied. Another consequence was that I, as a local funds' engineer, was superseded, and had to start as a contractor. The cost for supervision in the works executed by me was 6½ per cent., whereas the cost under the new system was 30 per cent.

250. I should have used the word "provincial" instead of "local"?—There are three kinds of work, namely, provincial, local, and Imperial. Provincial works are district works; local works are petty works, and Imperial works are great works.

Sir *George Campbell.*

251. Do you mean that irrigation tanks are made from local funds?—Yes, small ones would be.

Chairman.

252. What is the nature or size of the works classified as "local"; they depend, do they not, as a rule, upon the expense?—Yes, they depend upon the expense; branch roads leading up to railways are local works; wells, tanks, durrumsalas, schools, and hospitals, are considered local works. If a road is passing through from one province to another or a large bridge has to be constructed, it is considered a provincial work. A provincial work would be such as a bridge over the River Taptie; in that case the Government contributes a small per-centage, probably about one-third, towards constructing that bridge.

253. Therefore, there being three classes of works, local works, provisional works, and Imperial works, I suppose we may fairly assume that all those works which come under the last head are executed at a greater cost than those under the other heads, as regards the supervision. The proportion of charges for establishment and supervision in Imperial works would be greater than in provincial and local works?—It would.

254. And the cost of supervision in provincial works would be greater than in local works?—Yes, no doubt, but they are all amalgamated under one head. The chief engineer to the Public Works Department has a large palace at Bombay in which all the work of India could be done, although the work is such that one engineer in Great George-street would think himself very poorly employed if he had nothing else to do, yet the immense establishment swallows up one-third of the cost of construction.

255. The cost of the establishment is unnecessarily increased by there being too large a a secretariat, and too large buildings in which the secretariat is lodged?—Yes, quite so.

256. If throughout the greater part of India the best means of preventing the constant recurrence of famine and distress is by constructing irrigation works of less magnitude than those which have been made in Northern India, it would consequently follow, would it not, that if those works could be handed over to provincial or local funds they would be more cheaply executed than if they were classified as Imperial?—Most unquestionably.

257. That is, of course, assuming that the establishments of the different branches of the Public Works Department, those relating to Imperial, to provincial, and to local funds, were so proportioned as to be adequate, and only sufficient for the work which they had to perform?—Yes; I think the great difficulty with regard to public works in India is the increase of establishments; if I had given way to that my works might have cost as much as the works of the Public Works Department; but my own supervision enabled me to keep down the expense.

258. Assuming that the Indian Government were to devote a certain sum to the prosecution of public works of all characters and kind, it would follow that the more they could devote to the cheaper class of work the more work would be done?—Exactly so.

259. And that, therefore, if the Government spend some eight or ten millions annually in the prosecution of Imperial, provincial, and local works, a great portion of that money goes in the prosecution of what is known as Imperial works, it follows that at present we do not get as good a return for that expenditure as we might do if the work were differently distributed in proportion?—We do not get so good a direct return, certainly; small works and local works are necessary to

Chairman—continued.

to make a good return for the amount which they cost; the larger works, of course, being Imperial works, you must of necessity get a smaller return; but being Imperial, they are, of course, of Imperial importance.

260. You are of opinion that, at the present moment, there are too many highly-trained, able engineer officers in the Public Works Department for the work which they have to do?—If you have to pay 30 per cent. of the cost for supervision alone, it is self-evident.

261. And you are confident that a very large amount of the work which will have to be done in the next few years could be as efficiently done, and certainly more cheaply done, if native supervision and management were to a considerable extent substituted for the present European supervision?—As regards native executive work certainly; but there must always be European supervision; the actual laying out and setting out of the works must be done, not by Europeans sent out from this country, and all the executive part of it may be done by natives, but the supervision must be European. There are cases in which natives might take the position of being able to supervise, but at the present time there are but few of such.

262. Of course it would be necessary to train the men before you could utilise them in the work of supervision?—They are gradually getting trained; the difference in the country between the time when I went out in 1854 and the present time is very great. With regard to the question which was asked of Mr. Danvers about the engine-drivers, I might say that the companies could not introduce them before, because they were not trained, but now a class of natives is gradually becoming trained for that work. For instance, the Parsees of Bombay are quite as good engine-drivers as any Europeans.

263. Supposing you had that power to carry out your own ideas, what would you suggest as regards the construction and further prosecution of public works for the prevention of famine?—I would do as much irrigation as possible upon well-considered plans; that is to say, plans carefully thought out in every respect. I would also complete, as far as possible, all the main trunk lines of railway; and, when all those are gradually completed, I would introduce the feeders. Until the time that the main trunk lines are completed I do not think that feeder lines should be undertaken except as common roads. If you make a large number of feeder lines you displace a large amount of carrying power. If you were to make a line from Broach up to the corner at Ahmode you would make a cheap line of railway, but you would throw out of employ all the bullock carts, which have nothing to do for certain periods of the year, for the rolling stock of the farmers would be rendered utterly useless; you cannot use them for other purposes. When I went to Guzerat I tried to get a sort of tramway laid down, and it answered for the part laid down, but to be effective, it had to be tried as a system, and that prevented us from carrying it out, but it cost us 1,000 *l.* The difficulty in a country like Guzerat is, that there is no metal. I went over, some years ago, to Holland to see what plan was adopted in that country to make roads without metal, and when I went back to Guzerat I introduced the same system which they had in Holland, that is, paving the roads with stone. It is more expensive in the outset, but it is less expensive in the end, because when you have a road which is metalled getting out of order you have to repair the road, but if it is paved it does not get out of order. After I came back there was a long discussion between myself and the engineer of the Public Works Department as to the advisability of introducing this system. I was supported by the revenue collector and the Commissioners, but not by the engineer.

264. You are in favour of the promotion of irrigation works, and the extension of the railway system, so as to fill up gaps in the existing system, but you would not advocate the prosecution of large schemes regardless of financial conditions?—Certainly not.

265. And you do not believe that any schemes, no matter what amount was spent upon them, could effectually secure the whole of India from famine?—I am afraid that is an utter impossibility. I think that even if you had the most perfect system of irrigation these famines would still occur; you could modify them, but you could not prevent them. I think the mistake that General Cotton makes is this: he looks upon India as a huge country, which it is; the population, however, compared with the area, is very small, being only about 130 to the square mile; and then the wants of these people are as one to 10 of an European, and you have to provide, therefore, not as for 250 millions of Europeans, but for a population equal to 25 millions of Europeans. The wants and requirements of those 250 millions of natives, whether in food or anything else, bear about that proportion, and their capability as workpeople is about as 10 natives to one European. When I was in Madras there was a discussion with Sir William Denison, the Governor, with reference to the introduction of tramways worked by cattle. I made a calculation of the relative value of the European as compared with the native, and the result is about 10 natives to one European, so that when you are speaking of the relative wants of the population, they may be reckoned as 10 natives to about one European. Consequently, if you introduce a large system of canals rapidly, you could not first construct them; it would cause an abnormal demand for labour or for capital, and therefore you would disturb the whole economy of the country. You could not spend 10,000,000 *l.* annually upon canals and works of that description without doing so. And as regards the money itself, you could not raise it in this country very conveniently, nor could you raise it in India; you might raise a small capital in India such as is required for these cotton mills, two, or three, or five lacs of rupees readily enough.

266. In India, before a big work, either connected with irrigation or railways, is sanctioned by the Government, do the inhabitants of the locality ever express any opinion upon it, or have they any opportunity of knowing what it is proposed to do?—The inhabitants are somewhat apathetic; they look upon the Government as their father and mother, and all their relations put together; in fact, they expect everything from the Government.

267. Does anybody except the officers of the Public Works Department know anything about a scheme which is submitted to the Government; do they know that it is in existence?—They know of it, but they do not take any very great interest in it because it does not concern them. There

Mr. *Sowerby.*

6 March 1879.

Chairman—continued.

was not formerly that same amount of public enterprise and discussion which there is now. The natives now begin to establish cotton factories, and to take up land for reclamation purposes, and to spend large sums of money upon them.

268. But I mean before a scheme comes out sanctioned by the Government, is it subjected to any criticism except that of the officers of the Public Works Department?—None, except what it gets in the newspapers, and that is a thing very much wanted in India, namely, hostile criticism, which would bring out its weak points or its good points, if the scheme had any. I have occasionally criticised Government schemes in newspapers; for instance, the Taptie Irrigation Scheme I criticised in the "Times of India." They were going to make 25 per cent. according to their account, but it was evidently a very crude project, and the scheme was sent back for revision; and they found instead of paying 25 per cent. it would only pay 2½ per cent.

269. The Government are not in the habit of publishing or making known any scheme until it has received their sanction?—Never; even the newspapers cannot get hold of it. I think they have a system of laying certain papers upon the editor's table, but nothing is really known until a scheme is sanctioned.

Chairman—continued.

270. Of course the revenue officers would be consulted?—Yes, the revenue officers would be consulted.

271. But nobody, with the exception of that officer and the officers of the Public Works Department, would have cognisance of the scheme?—In India there is no public, except in the large towns like Bombay, and there the schemes which are brought forward are freely discussed in the papers, and sometimes they have a commission which sits and inquires into them, and witnesses are called upon to give evidence, as for instance upon the question of the drainage of Bombay. I was retained to give evidence against that proposition, but my evidence was refused, and the evidence of others was also refused. The scheme did not get that amount of hostile criticism which it ought to have had before it was carried out.

Friday, 14th March 1879.

MEMBERS PRESENT:

Mr. Agnew.	Mr. Fawcett.
Mr. Ashbury.	Lord George Hamilton.
Sir George Campbell.	Mr. Sampson Lloyd.
Mr. Childers.	Mr. Ernest Noel.
Mr. John Cross.	Mr. Onslow.

LORD GEORGE HAMILTON, IN THE CHAIR.

Mr. WILLIAM SOWERBY, called in; and further Examined.

Chairman.

272. ARE there any points in your previous evidence which you would like to supplement?—With regard to Question No. 215, I wish to say that I was one of a committee appointed in 1865 to investigate the possibility of making a harbour at Madras; that was part of my experience in India, and therefore I can tell the Committee somewhat about it, if it is required.

273. Perhaps you would be good enough to tell the Committee what you think of the present proposal?—I will just tell the Committee what occurred when I was at Madras. I had been previously round the coast of India examining the different harbours to see what could be done in the shape of improving them; and this I did, not at the expense of the Government, but at my own expense, at the suggestion of certain gentlemen who were connected with India, amongst others, Mr. George Noble Taylor, Mr. Fitzwilliam, Mr. Andrew, Sir Charles Trevellyan, and Sir George Balfour. I had proposed to make a harbour at Beypoor, the terminus of the Madras Railway. I proposed to make that harbour without a guarantee, and I got a preliminary concession from the Madras Government to carry out that work, intending to float the concern partly in this country and partly in Bombay; but the American war came to an end, and it was no longer feasible to float works of that kind as independent schemes. I was then, in 1865, in Madras, and a committee was appointed, at the suggestion of the merchants of Madras, for investigating the feasibility of making a harbour there. I was one of the committee, and different plans were proposed, one plan being proposed by a French gentleman, M. De Closé. We took into account all the different schemes that had been proposed for that purpose, and we concluded that a harbour was feasible, but it could only be a very second class harbour in the neighbourhood of the River Coom, a little way to the south of the black town of Madras and Fort St. George; we considered that the great scheme which was proposed I think originally by Colonel Cotton, and subsequently I think by Mr. Latham, and possibly some of the engineers connected with the Madras Railway was not feasible; that if a breakwater were made out opposite and parallel with the coast it would simply cause a silting up; or that if the scheme of Mr. Latham, which is something like what is now being carried out, were made it would also silt up, and that the only feasible plan was to make a moderately sized harbour on the Coom. There were several engineers upon the committee, Mr. Fraser, Col. Boileau, and also the master attendant, whose name I forget. I pointed out to the Committee at the time that there were not in existence proper surveys of the Bay of Bengal sufficient to base any large scheme upon for making a harbour at Madras, and I doubted even whether if they made a harbour at the Coom, it would be a great success. The harbour now being made is somewhat a modification of the plan proposed by Mr. Latham; it consists of a couple of groynes carried out on each side gradually closing to form an entrance, and if those groynes do as groynes always do in sea work, the inevitable consequence most follow, namely, that the sand and mud must silt up inside and around them. There are a number of examples of that at the Madras beach, where rough groynes were thrown up along the foreshore, and where the silting up commenced immediately; you have many examples of that in this country and in other parts of the world. The plan now being carried out may be successful, but it is a great experiment; I would not like to say it will not be successful; still it is an experiment, and one which, as an engineer, I would not like to have the responsibility of undertaking or advising to be done.

Chairman—continued.

274. The present plans are from the designs of Mr. Parkes, are they not?—Yes; he is an engineer of some reputation in this country, but I do not think that he has sufficiently studied the tides and currents of that coast. I doubt, indeed, whether there are surveys sufficient to enable anyone to study the tides and currents of the coast. It would be very much like attempting to make a harbour off the Yarmouth Roads or the beach at Brighton; the effect of the groynes must be to silt up, as they are produced. If you could take the whole thing out of a bandbox, and put it down at once, you would get deep water inside, but as the work goes on, it must silt up; that is the effect of all previous experience upon such works.

Mr. *Sowerby.*

14 March 1879.

275. You

Mr. *Sowerby.*

14 March 1879.

Chairman—continued.

275. You stated that you were to raise money to undertake to build a harbour at Beypoor, if the Government would give you a concession?—Yes.

276. Will you state to the Committee what was the nature of the concession you asked for?—The nature of the concession was this; that I should have all the land which I reclaimed inside the Beypoor river, and that I should be allowed to levy certain dues and tolls upon ships which came in, and that I should make it the terminus of the Madras Railway, which ended upon a desolate beach, with nothing at all. I calculated that if I got the land which I would enclose or reclaim, it would have been sufficient with the dues, which I could levy to pay the expense. I had been in communication with engineers in this country, men of great eminence, who backed up my schemes, and I was in communication with capitalists who were willing to have gone into the concern in this country, and also with capitalists in Bombay. At that time, in Bombay, the launching of large schemes of the kind was feasible, and the possibility of carrying this out was then very reasonable; but suddenly the American war stopped, and things dropped down; the plan could not be carried out, and I was obliged to give up my scheme.

277. If the Government were already to make to you that concession, upon the terms which you then asked, would you now be able to raise the capital?—At the present time I would not attempt to try it, because I have been disconnected with that part of the country for some years, but I think, with a little help from the Government, such a scheme would be quite feasible; it would be a termination to the Madras Railway, which now terminates on a desolate beach. The Madras Railway was laid out from Madras to nowhere, except passing through the country. The merchants in Madras were very jealous of the scheme, and I did think the harbour at Madras promoted in 1865 was rather promoted as an opposition scheme to mine.

278. But the main object which you had in making a harbour in 1865, I assume, was to ship cotton to England?—Yes, to ship cotton, coffee, and any produce which came down that side; possibly as far as Vellore and all that line the traffic would have gone to the western coast, and all beyond that line would have passed to Madras if that had been a feasible harbour; but I think that the probability is that the whole of the trade of Madras would have gravitated towards Beypoor, because of its being nearer to the Suez Canal.

279. But the great fall that has taken place since then in the price of Indian cotton would not, in your opinion, prevent you, assuming you could get your concession, from finding the necessary capital?—I never thought of trying it again, having met with no very cordial reception from the Madras people; my hope was to have raised the capital partly in Bombay and partly in England.

280. But was not it owing to the very exceptional circumstances which prevailed at the time, by there being a blockade of the southern ports of the United States, and consequently an unusual demand for Indian cotton, which alone rendered possible the prospect of your raising the necessary capital?—I did not view it in that light. The result of the great demand for Indian cotton was the introduction of large capital into Bombay, which wanted to find a use; but I looked upon the harbour as a thing feasible, and one which would have paid independently of any demand at that time, because it was the terminus of a great railway, which had cost seven millions sterling; it was the natural outlet of that railway at the western coast, and it was the nearest direct route to England; consequently the mere raising of the capital was facilitated by the fact of the large amount of money which had found its way into Bombay in consequence of the American war, but the value of the scheme was not enhanced in any way by that particularly, because it was in itself a good scheme independently of any temporary rise in the price of cotton; it would have been the terminus of a great railway, and the natural outlet for a very large district on the western coast of India; it would have been, in many respects, like the Carwar harbour, which I also investigated. I went along the whole of the west coast, and examined the whole of the harbours to ascertain what was feasible. Beypoor was fixed upon because it was the terminus of a great railway, and the Madras Railway Company supported my application to the Government; and I think they would have been prepared to support me in raising the capital in this country if the project had gone on.

Chairman—continued.

Sir *George Campbell.*

281. I understood you to say that, having taken notice of the width of ordinary carriages in several parts of the world, you came to the conclusion that by general consent the ordinary width of carriages was about 4 feet 8, and you expressed a strong opinion that to adopt the narrow metre gauge was a very great folly; I think you told the Committee that by making a line of light rail the 4 feet 8 gauge may be laid almost as cheaply as the 3 feet 3 gauge. Now I want to ask whether your observations would also apply in the case of the 5 feet 6 gauge of the Government of India, or whether it would not be much more difficult to lay a light and cheap railway upon a 5 feet 6 gauge than it would be upon a 4 feet 8 gauge?—I do not think that it would very materially alter the expense of such a line; I will give you an example. The Government are going to make a railway from Ajmeer to Ahmedabad, to join the Bombay and Baroda Railway; I believe it is to be the metre gauge. From my experience in India and my knowledge of that part of the country, I am quite sure that I, as a contractor, would undertake to make a 5 feet 6 railway through that country at about the same expense that you will make a 3 feet 3 railway for. I must first say, that I would not allow interference on the part of Government engineers, but give me, as a contractor, the same amount as you are going to pay for your 3 feet 3 railway, and I will lay you a 5 feet 6 railway of comparatively as good a quality, you specifying your weight of rails.

282. I do not want to ask any questions about your excellent mode of executing contracts, but I want to compare the difference of expense between laying a 5 feet 6 railway and a 3 feet 3 railway?—Weight for weight the 5 feet 6 railway would be in excess of the 3 feet 3 railway, but I would save in my way of laying it out; instead of laying down a 40 lb. or 50 lb. rail, I would lay a 35 lb. rail; I would use light carriages, and go at a less speed, for the destructive effect

Sir *George Campbell*—continued.

effect of carriages upon a line is as the square of the speed, that is to say, a speed of 20 miles an hour is four times as destructive as a speed of 10 miles; I would have a railway that would have a complete gauge upon which you could carry the ordinary carriages of the Bombay and Baroda, and the Central India Railway, at a less speed; as soon as the traffic increased I would lay a heavier rail.

283. But if you were employed to lay down a railway, and you were allowed to exercise your discretion, and the question was whether it should be a 5 feet 6, or a 3 feet 3 gauge, I want to know what proportion, mile for mile, the cost of the 5 feet 6 bears to the 3 feet 3, supposing you were allowed to make the 5 feet 6 railway light, with the object of carrying the same weight of traffic as the 3 feet 3 gauge?—The difference of expense would not be very great; the difference would be in a little heavier earthwork, but the slopes would be the same. In bridge work your foundations would be a little wider, but the wing walls would be the same: your iron pot sleepers would be the same; the wooden sleepers would be a little larger; the amount of the difference would be about 500 *l.* a mile more for the 5 feet 6 than for the 3 feet 3.

284. Can you state it in the shape of proportion, if the 3 feet 3 railway cost 100 *l.*, what would the 5 feet 6 cost?—If the 3 feet 3 cost 5,000 *l.* a mile, the 5 feet 6 would cost 5,500 *l.* or 5,800 *l.*

285. Would the 5 feet 6 railway require a heavier rolling stock?—It would require a wider rolling stock, but fewer in quantity; your carriages would be larger, and therefore capable of taking a larger load; the 3 feet 6 would be a very unsuitable gauge in many countries where you have agricultural produce, which is bulky, and therefore requires a larger carriage. There is the 3 feet 3 gauge on a branch off the Baroda Railway in the Guicowar's territory; that is very ill suited for that country, because the traffic is cotton, and therefore bulky.

286. The carriages being heavier, would it be possible to run them upon the same rail as you would run the carriages adapted to the 3 feet 3 gauge upon?—Yes, but the lighter rails would necessitate a slower speed; instead of running at 20 miles an hour, you would probably reduce it to 15, because, as I say, the destructive effect of a train is as the square of the speed.

[As regards Questions 281 to 286, I wish to add that I do not admit that railways on the metre gauge are necessary in the case even of hilly countries. I visited a railway lately in Spain, at the Rio Tinto Mines, where the country is very hilly, and the gradients and curves are the steepest and sharpest of any railway I have ever seen, and yet a five-feet gauge has been adopted, though the traffic is of heavy minerals, and if a narrow gauge would have had any advantages it would certainly have been adopted by the engineers of the works. A narrow gauge is only admissible underground; there are hundreds of miles of such narrow-gauge railways in England, but they are all underground; and colliery owners are too well acquainted with their own interests not to have adopted the same narrow gauge on the surface if they would have answered equally as well as the broader gauge. The instance of the Festiniog line, in Wales, has always been given as an example of the success

Sir *George Campbell*—continued.

of narrow-gauge lines, but it is a mineral line; and I was told not long ago by Mr. George Turnbull, formerly chief engineer to the East Indian Railway, and who is, or was, a shareholder in the Welsh narrow-gauge line, that they would be only too glad to have the line on the standard gauge of 4 feet 8½ inches, as it interferes greatly with their through traffic. If the line from Ajmere to Ahmedabad were an underground line all the way, then 3 feet 3 inches would be wide enough, not otherwise.]

287. Would you run a train slower upon a 5 feet 6 gauge than upon a 3 feet 3 gauge?—If I had the lighter rail I would run the train slower, but not much.

288. Is not the principal strain caused upon the engines; if you had a light engine upon a 5 feet 6 gauge, would it be possible to haul the ordinary carriages of the heavier rails upon that light line?—Quite so; but you would, of course, carry them at a slower speed; you may have locomotives of various sizes; I have seen locomotives recently in Spain as small as two tons each, dragging very heavy loads; in this country, upon the 4 feet 8½ gauge, I have seen locomotives as small as five tons, upon the Stockton and Darlington Railway, for example; the early engines were five tons weight. I have seen them, upon the improved principle, at six tons, but, of course, going with a small load, but at a considerable speed.

289. You expressed a great preference for native engineers, but, I think, at a later part of your evidence you also said it was necessary that there should be European supervision; now I want to know up to what point you think that the native engineers are capable of carrying on works; up to what rank would you reserve appointments in the engineering service for natives?—I think, at the present time, you must have a certain proportion of supervision by Europeans. By and by, and that not before long, natives will be able to take those higher posts. In Bombay, for example, there are two or three native engineers who are practising as civil engineers upon their own account, and they do every kind of work; they are as competent to do the kind of work they have laid themselves out for as Europeans; and I think in a very short time, in fact at the present time, you might pick out many native engineers who could take the supervision of a certain class of works, for instance irrigation works; when I was in charge of the Surat and Broach collectorate, I left in charge, during my absence in England, my native chief-assistant, and during the whole time I was absent he carried on my work as though I were present; he had been with me seven or eight years, and had had considerable experience, and did his work, though not probably as well as any European would have done it, yet quite satisfactorily to myself and to the collector, and to those under whom he was placed.

290. With regard to Beypore, did you have a concession there?—I had the offer of a concession.

291. Who offered you that concession?—The Government of Madras.

292. At that time had you command of capital, or what is the meaning of getting a concession; does it mean that you bound yourself to anything, or that the Government alone bound themselves?—The concession was made a preliminary

Mr. *Sowerby.*

14 March 1879.

Sir *George Campbell*—continued.

concession with the view of forming a company. I was supported by the directors of the Madras Railway Company and by certain capitalists in this country and by certain capitalists in Bombay.

293. But I want to know the nature of the concession; is it an arrangement binding upon the two parties, or is it an arrangement binding upon one party and not upon the other; is it a sort of "heads I win, tails you lose;" that the Government give you opportunities of getting up a company by which they are bound, while on the other hand you are not bound by anything at all if you cannot get up the company?—The concession in that instance was a concession to me personally as representing certain parties in England and Bombay; it was a statement of what the bases of the concession would be if the company were formed; till a company was formed it was not a concession; it was the preliminary stage of a concession, and the terms generally upon which the Government would assist the undertaking by conceding privileges to the undertakers.

294. Are the Government bound when anybody else is not bound?—The Government are not bound; they are only bound in a certain way to the general terms upon which such a concession would be granted; the question would be put to the Government, upon what terms are you prepared to grant to a company a concession, and those were the terms stated by the Government.

295. Has the Beypoor river or any other river upon the west coast been examined by the Government engineer?—Mr. Robertson was sent out by the Government; he examined the whole of the coast from Broach, and then he went round the coast to Ceylon and Madras, and reported to the Government. I have never seen that report; I have seen Mr. Robertson, and had a long conversation with him, and found that his ideas upon the subject of Beypore and other harbours were very much the same as my own.

296. That it would be practicable to make a harbour upon the west coast?—Yes, a second class harbour; you could not make a first class harbour at Beypoor.

297. You stated that you had been connected with some iron works in Kamaon; could you tell the Committee anything connected with those iron works?—The discovery of iron was made in Kamaon by Colonel Drummond about 1855; at that time I was an assistant engineer with the East India Railway Company. The Government applied for my services to investigate the character and extent of this iron deposit, which I did in 1855-56 in the cold season. A small experiment was then made as to the possibility of making iron, and that experiment was successful as far as making a few crude pigs of iron went, which proved that the stuff was iron, a matter which had been disputed for some time. I then came home on sick leave in 1856 with Colonel Drummond, and tried here to form a company, or rather Mr. Andrew tried to form a company, to carry on the work as a company in connection with tramroads in Northern India; the idea I suggested to him was to lay down cast-iron rails from the works through Rohilcund. After a considerable discussion, I was asked to go out there and take the charge of an experimental work, which I did. I took out with me a few Europeans, and some more came out afterwards, and we commenced

Sir *George Campbell*—continued.

those experimental works. We arrived out at the end of the mutiny, and had great difficulty in getting up the country. I sent out some machinery from this country which did not reach the works for a year and a half after I had arrived there. The consequence was that the works were delayed in their completion, and when this machinery came out to India, about one-third of it was lost, rendering the other parts of it perfectly useless. We put up one or two blast furnaces, and got the concern into working operation with a considerable amount of difficulty, and I succeeded finally in manufacturing a large quantity of iron at the place.

298. Was this on the part of the Government?—Yes, on the part of Government. Then, at the time when these works were in full operation, there came an order from Government that the hard wood of the Bharbhur should not be used for smelting purposes; that nothing, in fact, but soft wood should be used; when that order came I said you had better shut up the works at once; that I could not make iron with nothing better than burnt cork. The consequence was, that the Government decided to sell the works to a company, so I came home, the term of my engagement having expired. I have never been in that part of the country since, and do not know what has become of it. I have read from time to time that the company commenced their operations, but that they went down to the district a little too early, and that a greater part of them died, it being a very jungly place. At the time this proposition to carry on these works was made, Captain, now General Strachey, was anxious to undertake the works, and he proposed an expenditure of about 15 lacs of rupees to start them; and when the work was not given to him he was very much disappointed, and when I went out to India I found that I had to contend with two unfriendly parties; one was Colonel Drummond and his friends, who were displeased because he was not appointed, the other being General Strachey and his friends, who were displeased because he was not appointed.

299. Then you do not know anything about the history of the company, that they got a concession for which they paid nothing, and have held that concession for many years, and it may be to the present day?—I believe the company got a concession, and had to pay for the works about two lacs of rupees, but that I cannot tell; the concession was given upon the recommendation of General Ramsay, but they sent their men to the jungle a little too early, and the whole of them died, as I heard.

300. You do not know whether they have that concession still?—I do not; I have not been in that part of the country since.

Mr. *Ashbury.*

301. I suppose this concession which you were negotiating with the Government with respect to the harbour of Beypoor was practically upon the basis that you were to have the revenue from the land and the dues?—I was to have the land which I reclaimed as a freehold, that is to say, for wharves, and such like purposes.

302. To what extent?—To the extent of what I reclaimed only.

303. And the dues, I suppose, were to be levied upon a basis to be laid down by the Government?—That would have been a matter for consideration.

Mr. *Ashbury*—continued.

consideration. We should have charged, perhaps, 1 *s.* a ton.

304. But the Government would not have allowed you to put a tax upon vessels to any extent you thought proper?—Certainly not.

305. When this provisional concession was granted, were not those dues defined in the paper?—I do not think they were defined.

306. Supposing you and your friends had been in a position to have found the necessary capital upon the basis of that provisional concession, would the Government have been bound to act upon that concession?—They would have been to a certain extent bound. Of course, it would have had to be subject to the approval of the Government of India and to the Secretary of State.

307. But what would you have done in a case of that sort supposing any question had arisen upon the subject of dues, if it had not been provided for in the concession?—That would have been provided for in the concession to the company.

308. If you could not have agreed upon the dues to be fixed, you would have felt yourself at liberty to abrogate the original concession?—I should have said, I could not have had anything to do with the company.

309. When you stipulated that you were to be permitted to take the reclaimed land, I take it that there was a certain remuneration in your mind, or a per-centage of return upon the capital to be spent; what amount of per-centage would have justified your shareholders or friends in finding the capital?—I calculated that each ship coming there could have paid 1 *s.* a ton, and I then calculated that the quantity of tonnage that came into the harbour, paying at that rate, would have paid for the outlay upon a certain amount of capital. I then put them together; will that amount of tonnage dues, and the receipts from the waste land that we shall obtain, pay a fair amount of interest upon the capital. I then estimated what the capital required would be for carrying out the works, and I found that the returns would pay an interest of 5 or 6 per cent.

310. In point of fact, it was indirectly a Government guarantee, was it not?—Not exactly so.

311. But if the Government permitted you to raise those dues, it amounted almost, did it not, to an indirect Government guarantee?—I do not see that, because in the case of any harbour in India, or even in this country, the commissioners, or the people who are allowed to make the dock, are allowed to take certain harbour dues from ships coming in, but that is not a Government guarantee.

312. But why did the negotiation fall through; was it in consequence of your friends not being satisfied with the expected rate of interest?—Not exactly so; there was a general stoppage of everything; first there went down the Black Bay Company, then the Elphinstone Company, and Messrs. Borrodaile and Schiller, who were going to take an interest in the matter, also went down, and the whole thing collapsed.

313. How far up the river did you propose to carry your harbour?—I do not recollect that, but immediately after you crossed the bar you got into a very deep pool of 21 feet of water, which is in fact a natural harbour; the only difficult point of it was getting away that bar,

Mr. *Ashbury*—continued.

and protecting it by groynes. I was supported in my plan by a gentleman who has had immense experience in harbours, Mr. John Murray, the engineer of the Sunderland Docks. I knew a method of getting rid of that bar and clearing it away, and immediately you got inside the bar there was a large expanse of water, probably of two or three miles in extent, which was a deep pool, in fact a natural dock.

314. If the harbour had been constructed as you at one time intended, did you anticipate any danger from the silting up of the harbour outside?—I should have taken care of that by protective works.

315. I understand you to say that if this scheme had gone forward, you expected some assistance from the Madras Railway Company; now would it not have been rather *ultra vires* of the power of the company to have done that?—I did not expect financial assistance from the Madras Railway Company, but merely a sort of moral support or general support.

316. Then you were not expecting any financial support?—Only to the extent that they would perhaps have recommended the scheme to their shareholders, and assisted us in that manner. The chairman, the secretary, and all the other officers were ready to give us every assistance.

317. But that being a company under a Government guarantee, would have been a company guaranteed for making the Madras railway, and not for doing outside works?—The company would not have given me any capital, but they might, as I say, have recommended the scheme to their shareholders, who might have taken shares in it.

318. When the Government sold these iron works to the Company you mentioned, I suppose they sold them at a very serious loss?—It was not a very serious loss. I think the entire amount spent by the Government was about three lacs, and I think they sold the works for about two lacs.

319. You stopped those works in consequence of not being able to get suitable fuel, as I understand?—I stopped the works because they would not allow us to cut the hard wood, and the soft wood was not suitable.

320. How did the new company carry on the works if they were unable to use the hard material?—Because the Government, when they gave the concession, gave the hard wood too.

321. The Government conceded the very timber which you required as indispensable to carry on the works?—I believe they did so, but I am speaking now of what I heard.

322. Therefore, in point of fact, it would mean that there was a dead loss upon the transaction of a lac *plus* the entire concession of the hard wood?—Yes, a loss of a lac.

323. Are the works still proceeding?—I have heard of their revival from time to time. I think if they were properly managed they would pay, but not with the Government taking them up as a Government work.

Mr. *Ernest Noel*.

324. I wish to ask you a question with regard to the employment of native engineers: you know the irrigation works near Poonah, do you not?—Yes, I do.

325. Could native engineers have carried out that work, do you think?—Yes, except perhaps

Mr. *Sowerby.*

14 March 1879.

Mr. *Ernest Noel*—continued.

just the head-work, and I am not quite sure that they would not have carried that out too, because there is a work at Hydrabad which was entirely constructed by natives, which was quite as stupendous a work, and quite as good a work, and I think a great deal better and more skilfully constructed than that at Poonah.

326. Do you know how many native engineers were engaged on the Poonah works?—I do not know; there would be several.

327. It was a costly work, was it not?—Yes, it was a costly work.

328. Have you ever come across any natives who were educated at Roorkee?—No; but of those educated at Poonah, plenty, and at Madras also.

329. And you think all those men capable, at all events, of taking the sub-engineerships?—Not when they first come out of the college, but after they have been some time upon the works, certainly.

330. Would you say within a year or two?—Yes, within a year or two; the advantage in Poonah is that they have have at the head of the college a gentleman who was a practical engineer upon the Bombay, Baroda, and Central India Railway; and therefore the young men who come from that college are, as a rule, well grounded in practical work, such as a young engineer requires to know when he first comes on to works.

331. I suppose the demand for European engineers has been very great sometimes in the construction of works in India?—The demand for European engineers has been very great sometimes.

332. And there have been more employed than were necessary?—I would not say that there have been more employed upon railways than was necessary, but it is quite certain that there are at present more engineers in India than the staff Government can employ; the engineering staff now employed by Government would be sufficient to carry on works to the extent of 30 millions sterling annually if fully employed.

Mr. *John Cross.*

333. With regard to what was said as to the difference of gauges, would not the only saving between the metre gauge and the 5 feet 6 gauge be the difference between the weight of the rails and the size of the sleepers?—I do not think that ought or need make any difference in the weight of the rails, and very little difference in the sleepers; of course if you increase the weight of the rails and use pot sleepers you must increase your weight of sleepers.

334. That would be the only difference; the cost of cuttings and bridges would be about the same as upon the wider gauge?—Very nearly; there would be very little difference.

335. You made a statement with regard to the efficiency of native labour. I think you said that one Englishman was equal to 10 natives?—I did.

336. Would you give that observation general effect upon the whole work?—I would give that as of general effect in such work as, for instance, brickwork, earthwork, and all work which requires a considerable amount of strength, and I would give that opinion also in some respects as to their capabilities of supervising work; the natives cannot endure the fatigue of going about from place to place as well as the European; you could not put so large a district under a native as you could under a European, but the difference would not be in the proportion of 10 to 1 throughout. In speaking of 10 natives to one European I had reference more to their wants and requirements in respect to their food, their clothing, and their general housing and everything. If you speak of a community of 250,000,000 their wants and requirements are very much reduced when you consider those 250,000,000 are natives and not Europeans, therefore, in proposing any means for supplying these large numbers of natives with food or anything of that kind, you must considerably reduce the proportion with regard to them as compared with Europeans.

Mr. *John Cross*—continued.

337. I do not speak of their capacity for consumption, but of their capacity for labour?—Their capacity for labour is about eight to one.

338. Would you say that 10 or 12 navvies going out from here would do the work of 100 natives?—Not in that country, but they would do it here.

339. But in India what would they do?—Their physical capabilities would be considerably reduced.

340. You have no means of judging what their physical capabilities would be?—It is very seldom that they have been employed.

Sir *George Campbell.*

341. Are there not professional diggers in India who probably in India would do almost as much work as a navvy would do in this country?—There are the Wuddahs of Madras whom I have employed, who will do heavy work, but not quite so much as a navvy would do in this country, perhaps half.

Mr. *John Cross.*

342. With regard to the effect which the recent stoppage of public works, and the consequent withdrawal of capital, will have upon the labour market in India, will those native labourers have to be dispersed to their homes?—A large number of these native labourers are drawn from the agricultural population, and they will be dispersed to their homes, and instead of having two meals a day they will only have one; they will have to go half starved while the works are stopped.

343. And what becomes of the engineers?—The chief engineers of the Government are retained; the subordinates are dismissed.

344. Then the cost continues the same to the Government?—Yes; the cost of the establishment continues the same to the Government.

Mr. *Onslow.*

345. You mentioned, did you not, that Messrs. Borrodaile and Schiller, of Bombay, were interested in this projected Beypoor Harbour?—Not in the Beypoor Harbour; they were interested in the Madras project. I saw Mr. Schiller at Madras, and endeavoured to interest him; but he never took any interest in the matter, because it was just before the great failure in these things came about, and therefore he had no actual opportunity of becoming interested, but probably if things had gone on, he would have taken an interest in the Beypoor Harbour; he was at the time in Madras, and took a very great interest in the proposition of making a harbour at Madras, which was to be made upon the same terms as those on which I proposed to make a harbour at Beypoor.

346. At the present time you do not know whether

Mr. *Onslow*—continued.

whether or not Mr. Schiller is interested in the harbour at Beypoor?—I know that the house of Messrs. Borrodaile and Schiller failed, and I do not know that they take an interest in anything now.

347. That was the firm which took an interest in the Port Canning Railway and Harbour, was it not?—The same firm; they came to Bombay, and got a considerable amount of their capital subscribed at Bombay for that scheme.

Sir *George Campbell.*

348. They had a great many schemes, and went bankrupt at last?—Yes; the Government of India have been very unfortunate in their contracts in that respect.

Mr. *Onslow.*

349. The Government have been unfortunate in the men with whom they have contracted?—I will give you an instance in point: the Black Bay Harbour was projected upon the Tower of Babel principle, nobody knew what it was going to do; when I went there, in 1863, I took some trouble to explain to the Governor, Sir Bartle Frere, that the thing was impossible. Again, the Elphinstone Land Company did not know what they were going to do, they had no properly prepared plan, and I think that the Government were remiss in not having everything clearly defined before they gave a concession; the Company created a large wilderness of land for which there was no use, and built a few puddle docks, which rapidly silted up with five feet of thick black mud.

350. I presume you are of opinion that, up to the present date, neither the Government of India, nor the Presidential Governments, have been successful in the contracts they have made with the different individuals; at all events, the contract system between the Government and different companies has not been up to date a success?—The cases in which the Government have fostered companies have not been particularly successful.

351. With regard to the Beypoor harbour, what is the tonnage you calculated would have entered your harbour when made?—I cannot give you the particulars now; it has gone out of my memory. It is 13 or 14 years since I proposed the scheme, and I have lost sight of it since that time; but, if the Committee wish, I have all the papers, and I can bring them down here and show them the full details of the scheme.

352. How long were you under the Government of India?—About nine years.

353. You were not superseded, I believe; you retired?—The last appointment I had was on the Local Funds; the Government at that time had a great number of engineers for whom they had no employment whatever; therefore, seeing that they must find them employment, they took up all the works which I had under my charge, and I and several of my subordinates found our services dispensed with; we were told to go.

354. Do I understand you to say that, at these particular works on which you were then engaged, and after your dismissal, the cost of management under the Government was 30 per cent. higher than when you had charge?—I have the Administration Report of 1875–76, and upon that report they give the cost of the Government administration; the cost of the establishment is here given.

Mr. *Onslow*—continued.

355. But in the meantime I may ask whether the price of labour is about the same now as when you had the works under your charge?—The price of labour has considerably fallen; the price of labour varied very much, in Bombay, when I had charge of the works.

356. Has it fallen since then?—It fell during my time, and it has fallen again since then. When the famine came on, of course the cost of labour fell very much indeed.

357. And the cost of construction?—The cost of construction fell, but materials remained very much the same, only somewhat reduced. I can give definite examples of the price of different kinds of work, if it is desired.

358. At all events the contrast would be in your favour?—Yes, I find that the cost of establishment in that year was 22 lacs 50,000 rupees, which gives a per-centage of 25·29. That includes both Imperial and local funds. Taking the Imperial works separately, the cost for establishments was something over 30 per cent., and the cost for Local Fund Works, of which the items are given here, is 11·75 per cent., the two together giving an average of 25·29; whereas upon the particular works I was engaged on in Surat and Broach, the cost of establishment was 7½ per cent. In the next year the fact of the high cost of Government works was brought to the notice of the Government in the "Times of India;" and in the next year they managed to alter the form of the accounts, so as to apparently reduce the cost to 18 or 19 per cent; but that was done in this way, instead of charging all the expense of establishment to establishment, they charged a very large per-centage of it to "Works," such as masonry supervision and so on. I am informed by the Collector of Broach that he made a report, the year after I left, to the Bombay Government to the following effect. This is an official report, but I do not know whether it is printed or not. "The loss to Local Funds from the substitution of Public Works Agency, before Government insisted on the committee parting with their own experienced engineer, is, as was foreseen, very considerable, and if the system of charging the pay of maistrees to the works, in addition to the charge of 15 per cent., is permitted by Government, the total cost of Public Works Agency will be preposterously high. In other ways, too, the disadvantage of the new system has made itself felt; for instance, the Bhookhee Bridge, which was to have been erected by Mr. Sowerby for 40,360 rupees, cannot be built, as it is to cost double that money." I merely wish to illustrate the fact that by altering the form of account, as I stated, they reduced the expenditure apparently from 30 per cent. to 18 per cent., whereas, in reality, the expense continued the same.

359. Are you aware, in any part of India, of an engineer who was similarly situated to you at that time; by whose supersession the cost of works was increased 30 per cent.?—I take it that the Local Funds, as shown in their own administrative reports, were so much, and the cost of supervision was 11·25 per cent., but they changed the whole of the Bombay Presidency engineers, and dispensed with the Local Funds engineer, and then they raised at once the cost of the establishment.

360. Did they raise the cost to 30 per cent.?—Yes, practically, to 30 per cent.

Mr. *Sowerby.*

14 March 1879.

Mr. *Sowerby.*

14 March 1879.

Mr. *Onslow*—continued.

361. Then your particular case, as you maintain, was not a solitary instance?—It was not a solitary instance, as shown by their own report.

Mr. *Fawcett.*

362. This concession which you have spoken of was only for a limited period; I suppose you did not carry it out, and the concession lapsed?—The concession was not an actual concession, it was a statement of preliminary terms; a discussion with the Government of Madras upon what terms they would grant the concession to the company.

363. Therefore the Government were not bound at all?—They were not bound in any way.

364. You spoke of the great establishment charges; you did not simply refer to the increased cost of carrying out public works, but you also referred to the general costly arrangements which are adopted with regard to the Public Works Department?—The method of carrying out public works in India with Government engineers is, I think, most expensive. It is a question of policy. If the Government of India are to carry out the whole of the public works in India, then they must have an establishment to carry out those works. If they have to carry them out as companies would carry them out, those establishments, in my opinion, must be maintained; but I doubt if they would not get a very considerable amount of work done if they would encourage independent engineers going into the country, paying those engineers by results. There are at present in Bombay several engineers established who can do any kind of work which the Government require done. If the Government would encourage a number of engineers, more would go to that country, and then they would have the command of a higher class of men, and men with more experience than they have at present, and at a less expense, because if an establishment is once formed it must be kept up whether they have work to do or whether they have not. If they were to encourage engineers to go out there, and to engage them as you have to engage engineers in this country, then they would introduce a new element for the prosecution of public works, because an engineer in this country has not only to promote his scheme, but has to make it good, and then has to assist in getting individuals and shareholders together to carry it out; and in India you would introduce a class of men like that, who would introduce and mature schemes, and get the capital together to carry them out. That is done to a certain extent at the present day. There are men who have gone out there and started on a small scale with small schemes, and they have increased them, and are now working them as profitable concerns. I speak more particularly of cotton mills and ginning factories and tramroads; witness the Bombay tramroad, also gasworks.

365. But assuming that the Government has a Public Works Establishment such as the present Public Works Establishment, upon a costly scale, are the head offices at Bombay upon a lavish scale?—The offices in Bombay are in a little palace. The size of the building is such that it would probably accommodate the whole of the engineers in Great George-street, and, compared with the amount of work they have to do, is infinitely out of proportion. The grant for Bombay, for example, was 900,000 *l.* for one year. Now works costing 900,000 *l.* are a very small amount for one leading engineer in Great George-street to carry out in one year. He does not require an establishment as large as the whole of Great George-street, and his establishment is kept to a moderate size.

Mr. *Fawcett*—continued.

366. You say, from your personal knowledge, that the Public Works Department have offices in Bombay, at the expense of 900,000 *l.*, as large as the whole of the engineers' offices in Great George-street, or nearly as large?—Yes, about the same.

367. Now, in estimating the cost of the establishment charges, is there a part of the account carefully put down, the cost of the pensions of the engineers, and the interest on capital expended in building what you describe as these palatial offices?—I do not think so.

368. Therefore, high as the establishment charges are, they do not represent by any means what we may consider the whole cost of the Public Works Establishment?—Not at all.

369. For instance, they do not include pensions?—Certainly not.

370. Nor yet the cost of these buildings?—Nor yet the cost of these buildings.

371. Is there, or is there not, a surplus of engineers in India at the present time?—At the present time there is decidedly a surplus of Government engineers; the work which they have to accomplish might be done with a very much smaller number; and when I was in Surat, and the Broach district, during nearly the whole time I was there, there was the Government Engineering Department, and there was the Local Funds Department, but I had the bulk of the work in my hands, whereas they had just a small quantity, and it would not have been at all difficult for me, with a very little addition to my establishment of natives, to have carried on both works. Indeed I offered to Sir Seymour Fitzgerald to undertake the whole of the work, without any increase of pay, because sometimes the quantity of work which I had to do as Local Funds engineer was so comparatively small, though it only cost the Government 7½ per cent. upon the work done, that I was almost ashamed to take my pay.

372. Can you form any estimate of the number of Government engineers in India at the present time who practically have no employment?—I cannot say that I have seen any estimate, but I have seen many of the engineers when I was in India going about with nothing to do.

373. When was that?—In 1876 and 1877 I saw many engineers with very little to do; they were attending at their offices daily, but the amount of work which they had to do was extremely small.

374. Did you hear them complain that the amount of work they had to do was so extremely small?—They did not complain, because as long as they got their pay they had nothing to complain about.

375. I suppose the fact that there is a surplus of Government engineers is partly due to the policy which was adopted some years since, of sending out a fixed number of young engineers every year from Cooper's Hill?—That is one reason, but at the time the Government first began

Mr. *Fawcett*—continued.

began sending out their engineers I think there was already an ample number of engineers in the country to do the work; one gentleman I know came out in 1868 who had had some experience in Ireland as an engineer; I saw him before I left. He was put upon a work, and I said, "You have been here nine years, what have you done?" He said, "Well, I am ashamed to say that all I have done is the survey of the Tapti Irrigation Canal;" a work which, if it had been placed in my hands as Local Funds engineer, would have taken me six months, whereas he and his staff had taken six years about it.

376. Some of the contracts for these railways were made before the Government of India was transferred to the Crown, and some of them were made afterwards; is there any difference in principle in the terms of the contract under the two systems of Government?—I think the terms upon which the old East India Company first gave their concessions are pretty much the same; the rates of interest which have been paid, or the guarantee, have been lessened somewhat. In the early stage of the railways, when the old East India Company gave their guarantee, it was not a Government guarantee, it was, in fact, a guarantee of a sort of company; in fact, neither Government nor company, and the reason why these guarantees were given was that the East India Company was always upon its good behaviour for some time for fear that some of the large manufacturers of Manchester, or some distinguished Member should get up in the House and abuse them for not developing the resources of the country. After the Company was transferred to the Crown the nature of the guarantee was materially altered, and I think even at the present time there is some misapprehension as to what the practical nature of the guarantee is; the present guarantee is in fact an Imperial guarantee.

377. You do not mean a guarantee upon the revenues of the Empire?—A guarantee upon the revenues of the Empire, because it is different from the Colonial guarantees which are given. The Colonial Secretary of State does not back the guarantees which are given in the Colonies, but the Secretary of State for India backs the Bill, and I imagine he would have to pay it.

378. But it is simply a guarantee upon the revenues of India, is it not?—If the revenues of India failed, and the Bill came back upon the revenues of the Empire, I imagine the Crown would have to made good the amount.

379. But the Crown cannot pledge the revenues of England; you cannot in any way pledge the revenues of England without the consent of Parliament?—That may be so; but still I think it is an Imperial guarantee, and I think it would facilitate matters in the direction of getting money more cheaply, if the Government would acknowledge that it was so.

380. Some people think it might be better that the system should be placed on a different basis, but at the present time there is not the slightest legal responsibility incurred by England?—I cannot argue the point, but I regard it as an Imperial guarantee in all but the name.

[In reply to Questions 376 to 380, I wish to add the following remarks:—Public works may be divided into three classes; first, those upon which no dividend is expected, such as the Houses of Parliament, barracks, Government houses, as at Gunesh, Khind, Poona, and the Secretariat Buildings at Bombay; the second, such as telegraphs in India, to which the commercial community contribute partially, and they are necessary for Imperial purposes; and thirdly, railways, roads and harbours, to which the commercial community subscribe, or should subscribe, very largely. Canals may be taken as between Imperial and commercial; they are landlords' work entirely, and the Government of India is the landlord generally. In the matter of railways probably three-fifths to four-fifths is for commercial purposes, and the remaining two-fifths or one fifth may be regarded as Imperial interests and necessities. Works undertaken by Government are too often *forced* works; those originating with private enterprise are naturally required to meet the wants of the country; they should be encouraged, as tea, coffee, and chinchona plantations have been encouraged, but not necessarily either guaranteed, promoted, or undertaken by Government; they are in no sense Government works; to embark in them is a mistaken policy; it undertakes, on its own shoulders, that which should be borne by the community, and if pushed to a natural sequence, would end in communism pure and simple. The well understood principle in political economy, "that it is never wise to allow a purely dividend-seeking company to undertake the sole management of any business in which the people generally are directly interested, and which, by its nature or extent, may be more or less of a monopoly, or require more or less of Government aid or interference to keep it going," may be carried too far, and that is at present the danger in India.]

381. Passing to another question, you think, generally, do you not, that if natives were more largely employed, there would be not only a very great saving of money, but that in some respects engineering work would be better done, because natives are necessarily more intimately acquainted with the physical conditions of the country; is that the general tenour of your evidence?—That has reference to certain local works, and to works of irrigation. I think the natives are now beginning to take very much more interest in the works which affect different parts of their country than they did formerly. For instance, when the Governor lately went over to Kattyawar, there was a petition from the people of the port of Gogo to get the railway extended from Kattyawar to the port of Gogo. I think that natives might be employed as superintendents of many of the works in provinces, on committees, which might be placed under the superintendence of the Collectors and Commissioners. When I was in charge of the local funds I endeavoured as much as possible to make natives responsible for the works. There were committees appointed in the different districts from members of Local Funds Committees, and to those gentlemen I used to depute the overlooking of works in their district; and then again upon all the local funds roads I introduced the system of making each village responsible for the maintenance of the road which passed through it; and in this way it made the natives of the particular district interested in the work that was going on in that district.

382. But referring specially to irrigation works, you

Mr. *Sowerby.*

14 March 1879.

Mr. *Fawcett*—continued.

you think natives have a knowledge of the flow of water in their country, and the climatic conditions generally of their country, which would frequently enable them to carry out irrigation works better than they would be carried out by Europeans?—The natives of India have a better knowledge of the application of water for the purposes of irrigation than gentlemen or engineers sent out from this country. Irrigation is, as it were, indigenous to the country. In that class of works natives would, in a very short time, be fully competent to carry out works to any extent to which they are likely to be carried out in the future. Consequently the employment of natives upon this particular class of work is more desirable than it would be upon works such as railways, with which they are not so practically acquainted, or upon what I may call foreign works, which they are not likely to understand so well.

383. That, in fact, they have inherited, as it were, a knowledge of irrigation from the earliest times, whereas railways may be described as imported works?—Exactly so.

Sir *George Campbell.*

384. You are aware that a large number of engineers have been employed by the Local Funds, and other local bodies, and that they came from various classes; but inasmuch as they do not belong to any special service, and are not subject to any uniform test, there is a considerable variety in them; some are good and some are bad, I suppose?—Speaking of Europeans, they have not been subject to any particular test, except the test of the quality and general character of the work upon which they have been employed.

385. It is a good deal of a lottery, is it not; some turn out well and some turn out badly?—I do not believe that any of the Local Funds engineers have turned out particularly bad or particularly good.

386. You have never heard that some of them have run away with the money without doing the work?—I have never heard of such a case. They could not do it in my instance, because I had never a pice in my hands. The money was nearly all paid upon orders on the local treasury from the Collector.

Sir THOMAS LAWRENCE SECCOMBE, K.C.S.I., C.B., called in; and Examined.

Sir *T. L. Seccombe,* K.C.S.I. C.B.

Chairman.

387. I BELIEVE that you have very recently left the control of the Financial Department of the India Office?—I have recently retired from the office of Financial Secretary, and am now Assistant Under Secretary of State for India.

388. You have for many years been connected with the Financial Department?—I have for 50 years.

389. You are, I presume, acquainted with the nature of the reference to this Committee, and I believe also with the general purport of the evidence which has been given before this Committee?—Yes, I think I am.

390. We have had a good deal of information from the officers of the Public Works Department as to the result of the expenditure which has been incurred by them, and as the greater part of this expenditure has been incurred by borrowed money, we were anxious to obtain from the Financial Department evidence as to the nature of the restrictions and regulations which from time to time have been imposed upon the Public Works Department as regards the prosecution of what are generally known as Public Works Extraordinary; will you first inform the Committee what was the nature of the regulations, if there were any, previously to the formation of the Public Works Department by Lord Dalhousie?—There were no very distinct regulations of which we in England were aware. The charge for public works before that time formed part of the general expenditure of the country, and there was no separation between the Public Works and other expenditure except that it appeared in the accounts under the general head of Public Works.

391. And whatever expenditure was therefore incurred was met out of the ordinary revenue of the country?—It was part of the ordinary expenditure; at that time the financial result of the year was frequently a deficit, and of course the cost of public works, whatever it amounted to, tended to increase that deficit.

Chairman—continued.

392. Perhaps you can inform the Committee what, subsequently to the formation of the Public Works Department in 1854, has been the course pursued by the India Office in laying down regulations to control this particular class of expenditure?—The Court of Directors had repeatedly desired to have returns showing the expenditure on the construction of public works, and as far as they could be furnished, of the receipts from those works; but nothing effectual was accomplished during the time that the Court of Directors had the direction of Indian affairs; it was only at a later period that something more definite was attempted. About the year 1862, the balances in India being larger than were necessary, more money having been borrowed in consequence of an expectation that the general expenditure on military operations would have been larger than it proved, the Secretary of State, looking to the large amount of those balances, authorised the Government of India to expend three millions out of those balances in the completion of works of a remunerative character in progress, such as works on the Godavery, the canals in Sind, and subsidary channels from the Ganges, but only on works of the remunerative character of which but little doubt could be entertained.

393. Up to that time all railroads had been coustructed through the agency of guaranteed companies, had they not?—I have been referring only to those public works which were constructed directly under the orders of the Government, not to guaranteed railways. The railroads at that time were all constructed by guaranteed companies.

394. Then these works would, I assume, be mainly irrigation works?—They would be mainly irrigation works. In the next year, 1863, the Government of India proposed to construct barrack accommodation for their largely increased European force, which had been rendered necessary by the mutinies. The Secretary of State

Chairman—continued.

State objected; he said he was very desirous of providing barracks for the accommodation of the troops, but, inasmuch as the money available had been obtained by borrowing, he considered that whatever sum might be taken from the balances for public works should be applied to the construction of reproductive works.

395. Then subsequently to the year 1863, another application was, I believe, made?—In 1865, the Government of India submitted plans for expending a very large sum of money, 10,000,000 *l.*, during the ensuing five years on new military works, and 40,000,000 *l.* or 50,000,000 *l.* in the next 20 or 25 years on works of irrigation. The Government of India suggested that a large loan should be raised for the purpose, in order that the public works might not be liable to suspension from want of funds.

396. Who was the Viceroy at that time?—Sir John Lawrence.

397. What was the amount which they proposed to borrow?—They did not make a definite proposition as to the amount to be borrowed; they mentioned the very large sums which I have indicated, namely, 10,000,000 *l.* for military buildings, and 40,000,000 *l.* or 50,000,000 *l.* for irrigation during a certain number of years, and suggested that a large loan should be made for the purpose of carrying them on. The Secretary of State objected decidedly to any such proposition; he said he thought it would be highly injudicious to undertake to raise a loan for any amount until definite plans and estimates had been proposed and sanctioned; but that in regard to irrigation works, whatever funds might be necessary to carry out well considered plans, he would be prepared to provide.

398. Who was Secretary of State then?—Sir Charles Wood.

399. Then there was further correspondence, was there not, in the year 1866 upon this subject, when Lord Cranbourne succeeded Sir Charles Wood as Secretary of State?—Yes.

400. What was the purport of that correspondence?—I may mention that about the year 1866, there was a very strong impulse towards the construction of public works; it was manifest from discussions in Parliament, and generally it was looked upon as a panacea for all the evils of India, and while that feeling remained propositions were made and further correspondence took place, and Lord Cranborne said generally that he was very anxious that no time should be lost in maturing plans and deciding upon such irrigation works as were most urgently required, and that he would, when the approval of the Home Government should be given, be prepared to authorise such steps as might be necessary for raising any sum that might be required.

401. Then there was a reply to that proposal of the Secretary of State from the Indian Government?—In December of the same year the Government of India proposed to distinguish between ordinary and extraordinary charges on public works, and to show as extraordinary charges heavy outlay for special public works, parts of general schemes connected with important branches of the administration, such as unusually extensive projects for military barracks, for the central and district jails then in progress, and for similarly extensive projects for roads and other communications. The revenue would first be compared with the ordinary

Chairman—continued.

charges, and then with the ordinary and extraordinary charges, any deficit being met from the cash balance, by additional taxation or a loan, as circumstances might dictate.

402. But this was the first Despatch in which the Indian Government had formally made a request to the Home Government to allow a distinction between Ordinary and Extraordinary Expenditure?—Yes, such a distinction as afterwards existed. At a very early period, even during the time of the Court of Directors, the term "Extraordinary" had been used in the Estimates, but not as separating that expenditure from ordinary expenditure.

403. But this was the first occasion upon which the Indian Government had made a request to the Home Government to be allowed to expend annually a certain sum of money under the head of Extraordinary Expenditure, which expenditure was to be made in the nature of an investment?—That was so.

404. What was the reply of the Secretary of State to that proposal?—In reply to that proposal, Lord Cranborne approved of making a distinction in the accounts between Ordinary and Extraordinary Charges for Public Works, but he said great care was to be taken that no item should be included as an extraordinary charge relating to repair or construction of works which were not exceptional in their character; important trunk roads, he said, might be included, but great caution was to be exercised in admitting works other than those which were already in course of construction, and which were of essential importance to through traffic. Barracks sanctioned to meet the requirements of the large force of Europeans stationed in India since the mutiny might, he said, fairly be looked upon as an extraordinary charge. Their construction could hardly be deferred with safety, and yet the cost would be far too large to be properly debited to the revenue of two or three years. Jails were not to be admitted; so far as they could not be constructed out of revenue, he was of opinion that they should be deferred rather than increase the debt.

405. Then Lord Cranborne was succeeded by Sir Stafford Northcote as Secretary of State?—He was.

406. And in the ensuing year the proposals of the Indian Government were again revised when the Budget Estimates came home?—Yes.

407. Will you state to the Committee what was the nature of the criticisims of Sir Stafford Northcote?—The Budget Estimate of the Government of India for 1867-68 included jails among Extraordinary Charges, and the Secretary of State pointed out the necessity that existed for taking care that no expenditure of an ordinary character was included under Public Works Extraordinary, but that, as a general rule, all works should be treated as "Ordinary," excepting those which might be expected to prove directly remunerative, that is to say, capable of yielding a profit beyond the interest on their cost, and great works, such as the construction of the new barracks, which had been specially sanctioned as "Extraordinary" by the Home Government. There were several works, he said, included in the Public Works Department Account of the proposed expenditure of the special grant, which did not appear to him to fulfil these conditions. He concluded by saying, "If that distinction be made, the

Sir *T. L. Seccombe*, K.C.S.I., C.B.

14 March 1879.

Chairman—continued.

Extraordinary Expenditure will be the amount that may be properly provided for by loan."

408. Therefore the principle which was laid down in this Despatch was, that with the exception of barracks for the European troops, no works except those which would be directly remunerative were to be included in the category of Public Works Extraordinary?—That was so.

409. Was any money raised by loan spent upon the construction of barracks as a matter of fact?—It is very difficult to answer that question directly, because there was certainly no money raised purposely with that object, nor were any public loans raised specially for public works. As far as the cash balances would provide the required funds, they were applied to the construction of any works which were authorised, and whatever deficiency existed on the general account, including the expenditure on Public Works, was provided by loan.

410. During those two years was there a deficit in the ordinary account?—In 1866-67 there was a deficit of 2,517,000 *l.* In 1867-68 there was a deficit of 1,007,000 *l.*, that is exclusive of the expenditure in the second of those years of 602,000 *l.* on Public Works Extraordinary.

411. Can you recollect if the cash balances were lower at the end of those two years than they were at the commencement?—They should not have been, unless there was a withdrawal of deposits, which affect our balances in India. During the years 1866-67, when the deficit was 2,517,000 *l.*, we borrowed in India and in England 3,070,000 *l.*, therefore there should have been an increase in the cash balance at the end of that year. In 1867-68, when the deficit was 1,007,695 *l.*, and the expenditure on Public Works Extraordinary was 602,462 *l.*, making together 1,610,000 *l.*, we borrowed 1,900,000 *l.*; therefore the balances should have increased again that year.

412. We have now arrived at the financial year 1867-68; sanction having been given in the preceding year to the construction of barracks with borrowed money, when was that sanction withdrawn?—It was withdrawn in 1868, and although barracks had been included in the estimates, under "Public Works Extraordinary," there was never any charge for them included in the accounts under that head.

413. Therefore as our reference mainly applies to works which have been constructed with borrowed money, we may practically exclude the construction of barracks?—Certainly.

414. Now we come to the next year, namely, 1868; the Secretary of State, I believe, again addressed the Government of India upon the subject of these Public Works Extraordinary?—He did; and in his letter he said that he was of opinion that for reasons he gave in the Despatch, Irrigation Works and Special Fund Works (that was the Bombay Special Fund) were the only items that should be classed as Extraordinary.

415. Therefore the result of the communications which have passed between the Indian Government and the India Office during the past three years was to this effect, that the Indian Government had been constantly making requests to the Home Authorities to borrow money for the purpose of constructing different works, while on the other hand the Home Authorities had been gradually tightening and diminishing the purpose for which money might be so borrowed?—Decidedly.

Chairman—continued.

416. Now the next Secretary of State was the Duke of Argyll, and he again, I believe, very shortly after he assumed office, addressed the Government of India upon this subject?—In January 1869, the Government of India, with reference to irrigation and similar special purposes, informed the Secretary of State that the probable outlay that would be needed to carry out the works which were likely to be approved for execution in the next 10 years, would amount to about 30 millions, and that if expenditure on railways were added, the outlay on reproductive works (irrigation, railway, and special fund works) would be from six to eight millions annually.

417. Previously to this despatch had not a decision been arrived at by the Indian Government to discard the indirect agency of the guaranteed companies?—Yes.

418. Therefore this expenditure which was to amount to 30 millions altogether, and would be from six millions to eight millions annually, included a class of work which previously had been constructed by the guaranteed companies, and the capital expenditure of which did not appear in the annual accounts?—Quite so.

419. At what date was that decision arrived at?—In January 1868.

420. It was in consequence of the Indian Government having undertaken, in addition to the construction of irrigation works, the construction of railways, that the Duke of Argyll addressed them, was it not?—It was; and his instructions were to the following effect: he said he was sensible of the great importance of proceeding with irrigation and other remunerative works as rapidly as possible, with due regard to economy of construction, and was most anxious that no delay should arise from want of funds. As a general principle, he observed, it was desirable that loans should be raised in India, if they could be obtained on terms nearly as favourable as in England, and it was difficult to decide what additional interest would be counterbalanced by advantages which otherwise attached to loans raised in India. Again, on the 31st of August 1869, the Secretary of State referred to the importance of obtaining accurate information as to the remunerative character of the expenditure in India on irrigation works; he stated that the information hitherto received from the several Governments was not sufficiently precise, and requested that statements might be forwarded periodically from India, showing from each district the amount of the land revenue in 1856-57, the amount received in the year last completed, the expenditure on irrigation works (distinguishing that on new works from that on maintenance and repairs), since 1856-57, the increase of revenue due to irrigation, and the increase due to other causes, desiring that those statements might be carefully framed by Public Works and Revenue officers.

421. That was, I suppose, with a view to obtaining accurate information as to the returns which might be fairly credited to the irrigation expenditure which had been sanctioned in the past?—Yes, whether collected with the ordinary revenue or as water rates.

422. Did the Indian Government quickly comply with that request?—In 1870 the attention of the Government of India was called to that request, and no reply having been received from that Government, and returns only from Bombay, which were

Chairman—continued.

were imperfect, the Secretary of State again requested, in January 1872, that the information required might be furnished. Then in 1871, 1872, and 1873, came the inquiry before a Select Committee of the House of Commons on East India Finance, and that Committee directed their attention early to the accounts. In the first Report made by that Committee certain deficiencies in the accounts were referred to, and Mr. Harrison, the Comptroller General, who was in England at the time, was in consequence directed by the Secretary of State to prepare new forms of accounts, in order to show as clearly as possible, among other things, the expenditure upon irrigation and other public works, and what was the outturn of them.

423. Did the Indian Government then send home sufficient and satisfactory information upon that request?—They had not time to adopt the new form in 1872, but they sent home a good deal of information. It was, however, very imperfect, and in August and October 1872, the Secretary of State applied for further and clearer information.

424. As Financial Secretary, it was not sufficiently precise to justify you in embodying it in the account which was to be submitted to Parliament?—It was not possible to obtain from it anything like an accurate statement of what we got for the money expended.

425. I think that was almost the last communication that was addressed during the tenure of office of the Duke of Argyll to the Indian Government upon the subject of these Public Works Extraordinary?—It was. I am speaking always of those addressed from the Financial Department; occasionally despatches go out in the Public Works Department, which being more especially confined to the Administrative than to the Financial view, somewhat conflict with the papers or returns which emanate from the Financial Department.

426. But there is, I believe, no despatch of which you were cognisant which emanated from the Finance Department requiring greater information subsequent to the date of October 1872?—Not any.

427. Therefore, during the tenure of office of the Duke of Argyll, he re-affirmed the conditions which had been laid down by Sir Stafford Northcote as regarded Public Works Extraordinary, and he requested that information should be supplied to the India Office, in order that they might see what returns were attributable to the expenditure which had already been incurred?—He did.

428. And although the expenditure for some years previously to his retirement from office apparently increased, that increase was almost entirely due, was it not, to the State undertaking the construction of railways in place of the guaranteed companies?—Yes, no doubt to a great extent.

429. But not entirely?—I can give you the amount expended in each year on irrigation and on State railways up to the date of his retirement.

430. If you were to take for the five years preceding 1867 the amount expended in railway construction by the guaranteed companies, and then compare it with the amount expended in the five years subsequently to 1872, both by the State and by the guaranteed companies, you will find that although in the accounts the amount during the latter period seemed greater than in the former, it is not so?—It is due to the construction of State railways.

431. The capital account of the guaranteed companies being excluded from the ordinary revenue and expenditure account presented to Parliament?—Yes, we only show the traffic receipts and guaranteed interest.

432. Now we come to the time when Lord Salisbury was Secretary of State for India, and in the first Financial Despatch which he sent out in review of the Budget of 1874, he laid down certain principles regarding the construction and prosecution of public works, did he not?—He did; he said that the only ground on which the distinction between the ordinary and the extraordinary works could be justified was, that the works included under the latter head would prove to be remunerative by yielding, in the shape of annual income, a sum equal to the interest on the money expended on their construction, including interest for the period subsequent to the commencement of each work during which no income was obtained. That it was apparent that many of the State railways would not yield such an income, and that many irrigation works would be unremunerative in the same sense, and as the assumed ground on which some of those works had been excluded from charges against revenue did not really exist, the cost of them should be removed from the class of public works extraordinary. Works for the prevention of famine, he said, might, however, be executed, and if the money for meeting the expenditure could not be obtained from ordinary income, the works might properly be constructed from borrowed money, the expenditure being included among ordinary charges under a separate head. The amount of the home expenditure was then referred to, and the inexpediency of increasing it; and the Government of India were requested to consider it indispensable that only works which would repay the interest on the money expended on them were to be excluded from charges against income, that the utmost care should be observed in the undertaking and prosecution of such works, and that the necessary funds be obtained in India. A statement to the same effect was made by your Lordship on the 3rd of August 1874 in the House of Commons.

433. Lord Northbrook in his evidence stated that he understood that these rules only applied to future works, but not to works that had already been sanctioned and commenced?—That is quite correct.

434. In this Despatch, I think, for the first time, sanction was given to the Indian Government to construct what were known as Famine Preventive Works out of borrowed money, although those works might not be in the strict sense of the word remunerative?—That was so.

435. I think two years afterwards the Indian Government again communicated with the Secretary of State?—Yes, in a financial letter dated the 7th of April 1876, the Government of India said, "The principle by which our expenditure upon 'extraordinary' public works has been guided is, that however advantageous the extension of railroads or irrigation works may be, it would not be right to carry them on at such a rate as would require the imposition of fresh taxes. The rate of expenditure has accordingly been regulated by calculations which are given

Sir *T. L. Seccombe*, K.C.S.I., C.B.

14 March 1879.

Chairman—continued.

in detail in the forecasts of 1873 and 1875. These calculations show that any additional interest on account of money borrowed for the purpose of constructing extraordinary works, will be met from the increased receipts derived from similar works, which have been, or will, from time to time, be completed and brought into operation. We consider that this method of calculation, which has now been tested by the experience of three years, is safe, and that it enables the Government to control the expenditure upon extraordinary works more efficiently than if works were to be admitted under that category merely upon the faith of estimates of the returns which they may give; for such estimates are not unfrequently fallacious."

436. Therefore in reply to the principles which had been laid down some eighteen months before by the Secretary of State, the Indian Government suggest an entirely different principle, do they not. They propose that a certain sum of money should be taken out of the general revenues of India, for the purpose of making good the difference between the net receipts and the working expenses, and interest chargeable upon Public Works Extraordinary, and that this amount should become stereotyped, and that so long as it was not exceeded the Indian Government might continue to borrow for the purpose of the prosecution of railway and irrigation works?—That was the effect of their proposition.

437. This, I believe, was the last Financial Despatch which came from Lord Northbrook?—Yes; Lord Lytton took his seat on the 12th of April 1876, and this Despatch was dated the 7th of April.

438. I believe Lord Northbrook had made special arrangements in order that he might consider the Budget for the incoming year previously to the advent of his successor?—He had.

439. What did Lord Salisbury say in reply to that proposal?—Lord Salisbury replied on the 10th of August 1876, to the effect that it must be apparent to the Government of India that if works upon which loan funds have been expended are not remunerative to the extent of paying the interest on the money expended on them, and additional works be annually undertaken which will be unremunerative in a similar degree, every additional work must tend to increase the annual charge for interest which will fall upon the general revenue. Even, however, if the charge for interest on those undertakings should not increase, it did not appear to him that that consideration would be a justification for perpetuating the annual charge on that account. He then repeated the instructions contained in his letter of July 1874, that any sums required for Public Works Extraordinary must be raised in India, and that he could only consent to borrow in this country when extraordinary circumstances rendered it necessary. But in the same Despatch he said, that with regard to works under construction, the rules which he deemed necessary to be observed in regard to that expenditure in future, as laid down in his Financial Despatch dated the 23rd July 1874, No. 387, were correctly described by the Government of India as not intended to apply to works under construction. They considered that in regard to works hereafter to be undertaken, the adoption of those rules might be productive of inconvenience, and that as interest on

Chairman—continued.

money borrowed had been paid year by year out of the general revenues, and had not been provided by increasing debt, the expenditure on public works might be continued on the supposition shown in their forecasts of 1873 and 1875.

440. Therefore, in reply to the request of the Indian Government to substitute this new proposal, the Secretary of State simply reaffirmed the principles which had been laid down by his predecessor?—He did, except with regard to works under construction.

441. Then in the next year, 1877, I believe a good deal of attention was given by the Financial Department to the forms of account which were presented to Parliament with regard to these Public Works Extraordinary, and forms were sent out to the Indian Government by which both the revenue derived from, and the ordinary expenditure connected with, these works, should be separated from the ordinary expenditure and revenue of the Government of India?—That was so.

442. And now the accounts are presented to Parliament in such a way as to show what the exact cost to the State annually is of this policy of Public Works Extraordinary?—Yes, that is the intention of the present form of account, which is being carried out as fast as possible. There is one distinction which I should mention: the accounts as now presented take no notice of interest during the period of construction, which had been given for certain works in the accounts for the year 1875-76.

443. The intention of the account is to give, as time goes on, full and complete statements of all the charges connected with Public Works Extraordinary as far as they can be ascertained?—It is.

444. I suppose that every year we may hope that the Government will be supplied with greater details, and that the expenditure side will become more and more accurate?—There can be no reasonable doubt of that. There is a difficulty between the revenue and the public works officers in Madras and some other parts of India, in ascertaining how much revenue is due to irrigation, and how much is not; but with such a form of account it certainly ought to be produced completely within a year or two.

445. There is also a difficulty, apart from the question of charging interest upon construction, in ascertaining the full cost of the establishment?—That is one of the difficulties; it must be an estimate; it could not be an actual statement of cost.

446. And I assume also there would a difficulty with regard to pensions?—That has not yet been taken into account.

447. Do you think that it will ever be possible accurately to estimate what sum should be debited to the department for pensions?—I see no reason why it should not be done eventually; it ought to be done, in order to give a clear statement of the cost and out-turn of these works.

448. And your object of course, as Financial Secretary, in suggesting the forwarding of those accounts, was to give as accurate an account as was possible to Parliament of the results of this Public Works Extraordinary system?—Certainly; and not only to give it to Parliament, but it was important for our own information to see what we were really doing.

449. From

Chairman—continued.

449. From your experience I suppose you attach enormous importance to an accurate form of account as a check upon the expenditure upon Public Works Extraordinary?—In undertaking works of that nature, unless we have a very distinct plan laid down as to the conditions on which such works should be undertaken, and then have an accurate and intelligible account of what is done, there must always be great danger in the regulation of the finances.

450. In fact, it is not so difficult to lay down conditions which are sound in themselves, as to enforce those conditions?—By no means.

451. And unless you have an accurate form of account as regards those public works, it is impossible to tell whether your conditions have been infringed or not?—Quite impossible.

452. I believe, subsequently to the communications which took place on the subject of accounts, another Despatch was sent out to the Government of India, in the year 1877, relating to the rules bearing upon expenditure upon public works?—On the 12th of October 1877 another Despatch was sent, in which it was said that the rule that the expenditure on Productive Public Works must be met by borrowing in India must be kept steadily in view, although the existing circumstances of India prevented the application of that rule with all the rigour which, under normal circumstances, it would have been necessary to require. It was the famine expenditure in India which rendered it impossible to carry it out.

453. Then, in consequence of that famine expenditure in India you were not able rigidly to adhere to the principle which was laid down that all sums for Public Works Extraordinary should be borrowed in India, and I believe you addressed the next year, in April 1878, a Despatch to the Government of India upon that subject?—We did. Considerable sums having been borrowed in England to enable the Government of India to meet famine expenditure, and additional taxation having been imposed in India to form a Famine Insurance Fund which the Government of India proposed to appropriate to keeping down debt in India instead of repaying a portion of the debt incurred in England, the Secretary of State, on the 1st April 1878, informed that Government that whenever the demand for bills, and the state of the exchange would admit, the sum which had been provided from the Home Treasury to meet famine expenditure should be repaid from the million and a half which was to be raised annually on account of famines, and that such an arrangement would be strictly in accordance with the rule that all sums required to be obtained on loan for productive public works shall be raised in India, because if we raised money here on account of the famine, and instead of repaying us the Government of India appropriated the Famine Insurance Fund to expenditure in India, or to pay off debt in India, whenever a famine occurred again they would come to us for assistance, and we could not show but that the money which we borrowed for famine purposes had been expended on public works.

454. And therefore, unless some such rule as this were laid down, whenever any exceptional difficulty, such as that of famine, prevailed in India, you would have your policy reversed; you would have the debt increased in England, and whatever surplus there might be, applied to the diminution of debt in India?—Quite so.

Chairman—continued.

455. I think we now come to the second Financial Statement of Sir John Strachey, in which he proposed to put on additional taxation for the purpose of meeting the very heavy famine expenditure which they had had to meet during the past five years; what has been the main point of the Despatch which the Government of India sent home?—In the Annual Financial Statement of the Government of India for 1877-78, it was laid down that expenditure for the relief of famine must be regarded as an ordinary charge, and for reasons explained by Sir John Strachey in the Legislative Council on the 27th December 1877, the Government of India was of opinion that the annual cost of famine, in expenditure and loss of revenue, could not be taken at less than 1,500,000 *l.*, on an average. In the Financial Statement of 1878, for the year 1878-79, measures were indicated for raising that sum annually as a famine insurance fund. In their financial letter, dated the 16th September 1878, the Government of India again referred to the same subject.

456. This Despatch relates to the Budget for 1878-79, which was brought in in March 1878?—Yes.

457. Then the Government of India, in addition to their Financial Despatch of March 1878, again addressed the Home Government in September 1878?—They did.

458. And they made certain proposals as regards the construction of productive or re-productive public works, did they not?—Yes; their proposition was, adverting to the difficulty of discriminating between works wholly productive and those only admissible as providing against the effect of famine, to accept a yearly maximum dead-weight charge, to be paid as experience might suggest, for works constructed as productive, whether under the existing strict conditions, or as then proposed, in order to prevent famine, or give protection from famine, or diminish the expenditure for the counteraction of famine, if it should occur. In other words, they would limit to a specific maximum amount the net expenditure for the interest on the capital cost of all such works and their maintenance, after setting off all the net income yielded by the works. That amount they would for the next five years fix at 25 lacs of rupees in any one year in addition to their existing net liabilities, and they thought that the famine insurance fund of one million and a half sterling might be safely reduced by that sum, on the consideration that the construction of any works not fully productive, according to the existing definition, which might be thus facilitated, would cause an equivalent reduction of the ultimate liability on account of famines when they occur.

459. That proposal is a little complicated. I think it will be necessary to unravel it a little, in order to make it perfectly clear what the intention of the Government of India was. They suggested, in the first place, that a certain sum should annually be taken from the revenues of India to meet the cost of the Public Works Extraordinary?—A dead-weight charge.

460. That proposal is not very dissimilar from one that was made by Lord Northbrook in 1876. In addition to that proposal, they further suggested that a certain portion of the Famine Insurance Fund should be thus appropriated, and they

Sir *T. L. Seccombe*, K.C.S.I., C.B.

14 March 1879.

Chairman—continued.

they were to borrow to an amount the interest of which should not exceed 25 lacs of rupees?—Quite so.

461. And they proposed that the interest which was to be paid upon the sum so raised was to come out of the Famine Insurance Fund?—Yes.

462. You did not assent to that proposal?—No.

463. It is a very important proposal, and I think it is worth investigating a little further: as I understand, the object of the Famine Insurance Fund was to raise out of revenue a certain sum which might either be appropriated to the reduction of debt or to the prosecution of famine preventive works?—Yes.

Sir *George Campbell.*

464. After you had first paid off the debt for the former famine?—If after we had raised in England, say 10,000,000*l.*, on account of a famine, and reduced the remittance from India to that extent, they recouped us that 10,000,000*l.*, we should have it to use on a future occasion.

465. But you must recoup the millions spent on the last famine first?—Yes.

Chairman.

466. The object of the Famine Insurance Fund was to obtain a certain sum from revenue which might annually be devoted, either by the reduction of the debt or by the construction of works, to the prevention or mitigation of famine in the future?—It was.

467. Then this proposal is of a very different nature; it is to raise a certain sum which would increase the existing liabilities of the Indian Government, and to appropriate a certain proportion of the Famine Insurance Fund to provide the interest of those increased liabilities?—Yes; the effect of it would have been this, that we should have included on the Revenue side of our account 1,500,000*l.*, or thereabouts, of new taxation, imposed with a view to the mitigation of famine. We should have shown on the Expenditure side only interest, which was never to exceed 250,000*l.* on the money which the Government of India would borrow and expend, and we should show on the same side only such a sum as they might expend on protective works within the limit of their Famine Insurance Fund. So that, in point of fact, England would never have been recouped one penny of the sum which India had borrowed for famine, for they would retain that in India, shutting out all charge on account of famine expenditure; not one penny of the sum which they would expend out of the 6,000,000*l.* would be shown on the expenditure side, but they would show a surplus in the year which would not exist, and to that we objected.

468. Did you make any alternative proposal, or did you re-affirm the principle which you had previously laid down?—I will cite the Despatch in which we objected to the proposal. On the 20th February 1879, the Secretary of State said he was unable to agree to the proposed arrangement, considering that the present condition of the finances would not justify any loan for outlay on protective works, or any expenditure on them beyond what might be met from the receipts from special taxation recently imposed. The first claim on those receipts, he observed, being

Chairman—continued.

that of the Home Government for repayment of debt incurred here on account of famine, the sum of 750,000*l.* should be held available for remittance to England in the next and ensuing years on that account; the remainder might be appropriated at their discretion to extinction of debt, to relief of famine, or to the construction of protective works, not necessarily directly remunerative, but productive in the sense of guarding against a probable future outlay in relief. The Secretary of State said he could not, under present circumstances, sanction the raising of capital by loan for the construction of works which did not distinctly fall under the regulations laid down for productive public works. To guard against misapprehension, he deemed it necessary to draw attention to a statement in the letter from the Government of India, that they had omitted from the definition of productive works the condition prescribed in the Secretary of State's Financial Despatch of 23rd July 1874, that the works must be expected to be remunerative by yielding in the shape of annual income a sum equal to the interest on the money expended in their construction, including interest for the period subsequent to the commencement of each work during which no income is obtained, an omission which the Government of India inferred that they were justified in making by the tenor of Lord Salisbury's Despatch of the 27th September 1877. In that Despatch, which directed that the term Productive Public Works should be substituted for Public Works Extraordinary, it was stated that no change was intended to be made in the character of the works henceforth to be admitted into that category, and Lord Cranbrook added, that for the conclusion of any work in the productive class, it was necessary that there should be a prospect of its repaying within a reasonable time the whole of the interest incurred on the money expended in its construction, though it was immaterial whether the interest which accrued during the progress of construction was treated as a charge against the income of future years, or was added to the capital on which interest was to be paid.

469. And this, I think, is the last communication which you have addressed to the Indian Government upon the subject of the Famine Insurance Fund, or protective works?—That is so; there was another communication upon the same day, but it was comparatively unimportant.

470. Now you have placed before the Committee, in consecutive and chronological form, all the main despatches which have passed during the last 20 years, between the Home Government and the Indian Government upon the subject of Public Works Extraordinary expenditure. I think what must strike anyone is, that there has been constant conflict between the two Governments; the tendency of the Indian Government being rather to ask for additional powers, in order that they may expend more upon those works, and the Home Government, on the contrary, rather being disposed to restrict and to limit this expenditure?—That has been so.

471. Two perfectly distinct and contradictory systems of control have been imposed, one by the Home Government, and the other by the Indian Government. The Home Government laid down the principle that no works are to be constructed with borrowed money, except those which

Chairman—continued.

which will prove to be remunerative; whereas the Indian Government, on the other hand, contend that inasmuch as all the forecasts of the Public Works Department are based upon the assumption that a certain sum from the revenues must be devoted to meet the difference between the receipts and expenditure upon these works, that is the principle which should be accepted?—Yes, that is the principle they adopt generally, but when referring to the depreciation of silver, in another Despatch, they fully admit the general principles laid down by the Secretary of State. Their action is somewhat inconsistent; in some Despatches they admit the general correctness of our conclusions, but in others they indicate a desire to depart from our propositions, and adopt others.

472. By my question I did not mean to imply the least blame upon the Indian Government; it is undoubtedly the duty of the Secretary of State in Council to limit and control the expenditure in India, and it will be generally found in the nature of things there is a greater tendency on the part of the Home authorities to restrict expenditure than in India. Still it is the fact that I have correctly described the two principles for which the two parties, the Government in India and the Government in England, respectively contend?—Decidedly.

473. You have greater experience than any man alive in Indian finance, and I would like to ask you your own personal opinion about this controversy; not that you will differ from the published despatches, but that, having thought over this subject very often, supposing that you had absolute power to impose what conditions you liked, what would you do?—I could devise no better plan than that which has been laid down by the Secretary of State. I think those conditions are perfectly sound, and I think, if I may be allowed to say so, it is imperative that they should be acted upon, and that the Government of India should be limited in their expenditure in India on productive public works, and not limited merely to the amount which they might be able to borrow in this or that year, but that the very outside should be 2,500,000 *l.*, which I am satisfied is as much as they can borrow on reasonable terms in India, and provide occasionally for such emergencies as they should take part in helping to meet.

474. Therefore, at the present time you think that the Indian Government ought not to expend upon this particular class of work more than 2,500,000 *l.* annually?—I think so. An opinion somewhat to the same effect was expressed before this Committee by Lord Northbrook.

Sir *George Campbell.*

475. Including all the railway construction?—Yes, including all the railway construction and State works.

476. That means all railways, because all railways now are State railways?—All new railways are State railways.

Chairman.

477. It has been admitted in evidence that the establishments of the Public Works Department are sufficient to carry on works involving a much larger expenditure?—Undoubtedly.

478. I suppose you would not hesitate, if you considered this a right and sound policy to follow, to reduce those establishments?—I think the sooner they are reduced the better.

479. I suppose you cannot help thinking that the mere fact that there are so many able engineers in India who have not very much to do, must necessarily lead to a large number of schemes being brought under the notice of the Indian Government?—No doubt the officers of the Public Works Department are zealous, like officers in other departments, to carry out great works, which will distinguish the Government under which they serve, without reference to financial considerations.

480. In fact, the abler they are the more ambitious they are, and the more inclined to underrate the financial difficulties which it is their duty to overcome?—Yes.

481. It is one thing to lay down sound principles, it is another thing to get people to respect them; and speaking in a tone of friendly criticism, what naturally occurs to one in looking over all these transactions is that the Home Government have laid down excellent principles, but have not been able to enforce them?—That is so.

482. In fact, if you put a very rigid application of a test, which we all admit is a sound and proper one, upon the expenditure which has been made upon the works, not one of them would be found to comply with the description given in the Despatches?—I believe that to be the case.

483. Would not it be wise to see if we could not hit upon some other means of checking the expenditure, which, although it might contain principles less sound in themselves, yet would apply a more practical control over this expenditure?—If such a plan could be devised.

484. You have been for a very long time head of the Financial Department, and without paying you undue compliment I think it very unlikely that any Secretary of State could have a more experienced and more able or more pertinacious adviser than you have been; now you have succeeded in carrying all the Secretaries of State with you in these Despatches in laying down certain sound principles, but, unfortunately, one cannot deny that they have not been complied with; now do you think it likely that anybody else will be more successful than yourself in the future?—It is a question in which great interest is taken by members of the Council of India. The Financial Secretary is an officer of the Secretary of State; he can only submit propositions to the Secretary of State, and as your Lordship is aware, they are referred to committees of the council, and are very fully considered. All these most recent propositions have been approved by the Council of India after very full consideration.

Mr. *Fawcett.*

485. But not in India?—No; by the Council of India, the Council of the Secretary of State; and there is a determination, at present, to see that they are carried out.

Chairman.

486. What occurs to me as one of the great difficulties of the present system is that a work may be sanctioned upon the supposition that it will prove remunerative; money is borrowed, the work is commenced, and proceeded with, and then when some progress has been made it is discovered

Sir *T. L. Seccombe*, K.C.S.I., C.B.

14 March 1879.

Chairman—continued.

discovered that the estimates require revision, and that practically there is no prospect of this work proving remunerative; that has happened, I am afraid, more than once?—It has.

487. Now what would you do with such a work; it does not come within the terms of the conditions laid down, and it is difficult to transfer it to any other account except that of the Public Works Extraordinary?—Of course that is a difficulty which the Secretary of State has had to keep in view. However carefully estimates may be prepared, there is no doubt that they are almost always liable to error, and he has laid down distinctly that if during the progress of a work it should be found that the estimates were altogether wrong, such a work should be removed from the class of productive public works constructed out of borrowed money, and so make the Government responsible for finding the means out of their ordinary expenditure.

488. The great merit, it seemed to me, of the new form of account is, that every large work which is constructed by the Public Works Department with borrowed money is debited with the cost of maintenance, and the interest due upon the sum raised for its construction. Therefore, anybody can see at once whether it is or is not remunerative; that is the case, is it not?—It is.

489. Now, supposing you transfer a work which has been commenced with borrowed money, to another account, and include it in the ordinary expenditure, the funds for the prosecution of that work must come out of the ordinary revenue?—Yes.

490. If the ordinary revenue and expenditure are nicely balanced, it is quite clear that this work must either be stopped, or that the money must be borrowed for its construction?—Clearly so; that event has been contemplated in the papers of the Government of India. They went so far in one of their letters as to say that in such a case the works should be stopped. There is a difficulty with regard to our account which it is important to keep in view. That account will not show the real effect of the work until it has been completed: it will be comparatively useless until the work is completed, for the purpose of showing whether that work is really remunerative or not; but during the construction of the work, the officers of the Government and the Government of India would become aware whether a work was being constructed within the estimates, and would be in a position to judge what the probable out-turn would be when it should be completed. So, therefore, if a work during construction should be found to be much more expensive than had been estimated, and there was no prospect of a larger return, that work clearly should not be pressed on to such an extent as to embarrass the finances if it were transferred to the ordinary expenditure. That appears to me the best mode of meeting the difficulty.

491. Still now, as a matter of fact, I will assume that there will be surpluses upon the ordinary account for the next four or five years; a work has been sanctioned as a public work extraordinary, or, as they are now called, I believe, productive works, and it is put in that category, and the money is borrowed for its construction; so long as it remains in that category the cost of maintenance and interest will be

Chairman—continued.

charged against it; it is found, however, that it will not be remunerative; it is transferred to the ordinary account, and is made up out of ordinary revenue, and year after year a certain amount of surplus revenue is devoted to the construction of that work; the result is that the work is constructed out of the revenues of India; the cost of it, and the interest which would otherwise be charged against it, would be altogether omitted from the account, and the only fact in connection with that work which will appear upon the accounts is that the Government get a certain revenue from it?—No, that is hardly so. If the expenditure were transferred to ordinary charge any income from that work would be transferred to ordinary revenue.

492. Is not the process by which that work passes from extraordinary account to ordinary account likely to mislead?—The Government of India and the officers of the day have a direct interest in keeping their expenditure within their income, and there is a very large class of public works many of which are remunerative, which are shown now under Public Works Ordinary, and the works referred to would go with them.

493. Supposing this work, indicated by my hypothesis, were constructed out of surplus revenue, it would absorb a certain amount of surplus revenue which would otherwise go to the reduction of the debt, and therefore it is much the same thing as if it were made out of borrowed money, is it not?—No doubt the Government would be saddled with a bad speculation, and must make the best of it.

494. And do you not think that if you would keep this bad speculation in the account of the Public Works Department it would stand in the eyes of the public as a warning of the somewhat sanguine estimate of the Government?—If you could do that without allowing further expenditure on account of it to be provided by borrowing, that might be done, or works which had once been included and had been removed, and were no longer to be constructed by borrowed money, might be shown in a separate statement; by that arrangement you would accomplish the end you have in view.

495. I would like to put an alternative principle to that which has been so continuously supported by the India Office; it does not exactly resemble the suggestion of the Indian Government, but there is a certain amount of similarity between them. The Indian Government propose that the dead-weight interest for Public Works Extraordinary should be the same amount as it is now for a certain number of years to come; and they further propose that a sum may be borrowed the interest of which is not to exceed 250,000*l.*; therefore, the total dead weight upon the revenues of India would be a present sum necessary to meet the interest on money borrowed for public works, plus 250,000*l.*; that, I think, is a correct exposition of the proposal of the Indian Government?—It is.

496. Now, supposing I put it in another shape, and that you were to say to the Indian Government, according to your forecast, you will want 2,000,000*l.* to make good the difference between the receipts and the expenditure upon your Public Works Extraordinary; we will allow you to spend sums so long as you keep within that margin, but we warn you that three years hence

we

Chairman—continued.

we shall require that amount to be reduced; we shall wish it to be revised every three or five years, with the view of gradually diminishing the dead weight upon the revenues of India; but we shall require every work, whether protective or famine preventing, or a work which is necessary upon political or military considerations, to be included in that category. Do not you think we shall be able to get a greater hold over the Public Works Extraordinary expenditure by laying down such a proposal than by sending out principles which though sound in themselves are very difficult to enforce?—I think the objection to that scheme would be, that works would be undertaken, and if they were not remunerative that amount must certainly increase; you would therefore find yourself in this position when the time came at which you would say the amount must be reduced, that you would have works in progress which would render it impossible to reduce the amount; and how is the Government then to keep within the specified amount of interest?

497. No doubt it would be subject to that danger; but if the expenditure on public works is to form an essential part of the annual statement of the Finance Minister, both the Indian Government and the Home authorities would be able to see annually whether the amount which they so appropriated would be exceeded or not?—But surely the object is to prevent the item for works being exceeded, and that you can only do by preventing works being undertaken which will not be remunerative.

498. I quite agree with you; but the defect of the present system, as it appears to me, is that the Indian engineers of the Public Works Department send in estimates for a certain work; they have gone carefully through those estimates, and they conscientiously believe them to be accurate; you are bound to accept those estimates, and having accepted those estimates, the work is sanctioned, and when it is once commenced, as you know, it is excessively difficult to prevent its being continued. It seems to me that under the present system you are subject to just the same difficulty that you would be under my proposal, but with this difference, that you would be able then to say to the Indian Government, You have constructed that unremunerative work, and until you can bring down your ordinary expenditure to the sum which we have set apart, we will not allow you to construct any more works?—The proposition of the Government of India is that they shall have a certain dead weight of charge allowed them, whereas your proposition is, that instead of the Government having whatever benefit will be derived (and it must be expected to be considerable) from works which are now under construction, but which are not yet paying, we should fix a certain time when a reduction of that dead-weight charge is to be made. Now I do not think that it would be practicable to do that. I do not think that General Dickens, who has gone through these accounts very carefully, and who said that he thought 6 per cent. would be obtained from a large number of these works, could give a very definite estimate as to when that result will be attained. Therefore you would be giving an opportunity, by that dead-weight allowance which the Government of India have not at present under the system which the Secretary of State has laid down, to undertake works which will not be directly remunerative.

499. But the Secretary of State has not assented to the principle that a certain sum shall be appropriated from the revenues of India for the purpose of making good the deficiencies of the Public Works Extraordinary, but we all know as a matter of fact that that is what takes place; and would it not be wiser to recognise what is almost inevitable, and rather than find money when it is clear that these works will not pay, to lay down principles capable of stringent application?—I think it is much more important to limit the expenditure. You are liable to famines, and you are liable to changes in regard to remittances, and what do we find? The House of Commons is most reluctant to give us power to borrow a penny. The Government of India in all these arrangements show a very distinct anxiety that we should borrow again in this country. Now, how is that to be prevented, unless you tie them down to constructing productive public works only to such an amount as will be within that which they can borrow in India?

500. In fact, you are rather alarmed at any proposal which will afford the Indian Government any facilities for adding to their liabilities?—Yes, because we see that the proposition as to dead weight is in that sense; it is a Public Works Department proposition, without any sufficient recognition of the difficulties and dangers which it entails upon the Financial Department.

501. The objection which I rather personally feel to the present conditions which have been laid down, is that they always give a loophole to the Public Works Department to transfer a work after it has been put in one category into another. For instance, a work is constructed, or sanctioned, as a remunerative work; then it turns out to be not remunerative, and then we are told it will be a famine preventive work, and then we are told it can be proceeded with?—That would be a great departure from the understanding with regard to famine productive works. The plan which the Secretary of State has laid down with respect to them is very distinct: three quarters of a million must be held available for remittance home annually, and three quarters of a million will be available in India out of the new taxation. Now with regard to the second 750,000 *l.*, protective works must be constructed not out of the sum which we require for productive public works, but on works of importance for protecting us from the consequences of famine, and yielding some income. If you give them any further power they would show only an expenditure of 25 lacs annually, but might borrow 6,000,000 *l.*, and at the time of borrowing for productive public works they might also be borrowing for protective works; and certainly the Indian market is not sufficient to supply capital for both.

502. You use the term "public works" now, as meaning "extraordinary public works;" but all the principles with regard to public works extraordinary apply equally to the productive public works, do they not?—Yes

503. Now with regard to works which are necessary upon political or military grounds which should be rapidly completed, but which are not likely to be remunerative, how would you deal with those expenses?—As ordinary expenditure,

Sir *T. L. Seccombe*, K.C.S.I., C.B.

14 March 1879.

Chairman—continued.

penditure, in the same way as the cost of a war, or any expenditure which is necessarily entailed upon a Government.

504. If the Indian Government says it is absolutely necessary to make this expenditure, they will probably incur a deficit which you will have to meet by borrowing?—Yes, that will be seen at the end of the year, although perhaps not in the Estimate; if a war occurs, the Government must not hesitate to budget for a deficit; it is not as it is in this country, where the Finance Minister can raise the money he requires by an addition to the taxation; if we have a necessary war involving us in five millions of expenditure, we must show a deficit for the year, and borrow to meet it.

Mr. *Onslow*.

505. You might have a supplementary budget, might you not?—Yes, in Lord Mayo's time you may remember that we had one.

Chairman.

506. Although you admit that the question is a very difficult one, still, on the whole, bringing the whole of your experience to bear, you prefer to adhere to the conditions which are laid down in the Despatches from the Secretary of State?—Yes, I have no doubt of the soundness of them.

507. At the present time you are very much alarmed at anything which will greatly increase the liabilities of the Indian Government?—The present position of the Indian Government should be understood. We have no power to borrow in this country. We have great difficulties with regard to the remittances from India, and we are pressed for an expenditure on public works in India to be provided by borrowed money to an extent which the Government of India will not be able to obtain there on reasonable terms: now surely if anything would make one anxious about the finances of India, and watchful that no risk should be run which can be avoided, it would be such a state of things as that.

Thursday, 20th March 1879.

MEMBERS PRESENT:

Mr. Agnew.
Mr. Ashbury.
Sir George Campbell.
Mr. Childers.
Mr. John Cross.
Mr. Fawcett.
Lord George Hamilton.
Mr. Sampson Lloyd.
Sir Joseph M'Kenna.
Mr. Ernest Noel.
Mr. Onslow.

LORD GEORGE HAMILTON, IN THE CHAIR.

Sir THOMAS LAWRENCE SECCOMBE, K.C.S.I., C.B., called in; and further Examined.

Sir *T. L. Seccombe*, K.C.S.I., C.B.

20 March 1879.

Chairman.

508. I THINK there was one answer which you gave in your evidence on the last occasion, which you wished to a certain extent to qualify?—Yes. I refer to the answer to Question 482. The question was "If you put a very rigid application of a test, which we all admit is a sound and proper one, upon the expenditure which has been made upon the works, not one of them would be found to comply with the description given in the despatches." The answer given was, "I believe that to be the case." I would wish to modify that answer, and to say that, with very few exceptions, I believe that to be the case.

509. Or, to put it generally, those works were sanctioned in the belief that they would prove remunerative, and, with very few exceptions, they have not done so; by remunerative I mean that they would repay the interest due on the money borrowed for their construction?—When some of the works were sanctioned the rule had not been distinctly laid down as it has been since; therefore I am unable to say that when all the works were sanctioned it was expected that they would be remunerative; it was expected that they would be remunerative in a certain degree, but not to the extent which was afterwards clearly defined by the Secretary of State, namely, that they should be remunerative in the sense of paying interest on the capital expended on their construction, including interest for the period during which they were under construction, and no revenue was derived from them.

510. But no irrigation works were sanctioned except upon the understanding that they would be remunerative?—That was the understanding.

511. But a certain number of railroads were sanctioned, because it was believed that the indirect advantages which the Government would derive from them, would justify the Government in appropriating a certain portion from the general revenues to meet the difference between the net receipts and the charges relating to them?—I believe that to be strictly correct; but at the same time I have no personal knowledge of the circumstances under which the several works were sanctioned; the matter in no way comes within the scope of the duties of the Financial Secretary. Such sanctions are given in the Public Works Department, to which a separate secretary is attached, and if the Committee are desirous of information on that point, it will be requisite to call the Public Works secretary. My duties consist in endeavouring to lay down a system which should obtain a clear form of account, showing what the expenditure and the income is, and also in prescribing as rigidly as possible the rules which, with a view to our financial interests, should govern the expenditure.

Chairman—continued.

512. And it rests, in the administrative sense, rather with the Public Works Department to apply in the individual cases the rules which are laid down by the Finance Department?—Certainly.

513. In the latter part of your evidence you expressed a very strong conviction that it would be inexpedient, at the present moment, for the Indian Government to largely increase their liabilities in order to construct these productive public works, and you were asked whether you had any statement of the loans which have been raised during the last few years?—I have here a statement which has been compiled in the India Office with great care; but we have always had a difficulty in dealing with the different characters of the debt which has been incurred for a succession of years in India. We have applied to the Government, and are expecting a complete statement of the debt. I believe this statement to be as accurate as anything which can at present be prepared in this country.

Sir *George Campbell.*

514. Are there any local debts at this moment?—There are hardly any, I believe; I have understood that two or three small loans were locally raised for the construction of some small branches of railway, but of those I have never seen any record. It has been stated that there were such loans, and that the natives readily subscribed to them.

Chairman.

515. You have before you a statement of debt which has been incurred during a considerable period?—I have, from the year 1837-38 down to the present time.

516. For the last six years the Indian Government have had to make great disbursements on account of famine expenditure, have they not?—They have.

517. Perhaps it would interest the Committee if you could give them a statement of the loans which

Sir *T. L. Seecombe*, K.C.S.I., C.B.

20 March 1879.

Chairman—continued.

which have been raised from the commencement of the Bengal famine annually up to the present time?—I do not propose to give the estimated loss of revenue, unless the Committee desire it, because a large portion of that will probably be recovered. The famine expenditure in 1873-74, was 3,864,673 *l.*; in 1874-75, it was 2,237,860 *l.*; in 1875-76, the expenditure was 508,554 *l.*; in 1876-77, the expenditure was 2,145,431 *l.*; in 1877-78, according to the regular estimate which is the most recent advice which we have in any complete form, the expenditure was 5,231,309 *l.*; and in 1878-79, according to the Budget estimate, the expenditure would be 500,000 *l.*, making a total of 14,487,827 *l.*

518. Will you now give the sums which were raised on loan both in England and in India for each of those years, first taking them separately?—In the first year, 1873-74, in India there was a net amount of debt paid off of 41,078 *l.*; in the next year they borrowed in India 3,432,669 *l.*, and in 1875-76, 2,923,022 *l.*; in 1876-77, they paid off 849,855 *l.*; in 1877-78, they borrowed 3,031,878 *l.*; and in 1878-79, according to our most recent advices, 2,494,143 *l.*

519. That is the amount borrowed in India?—Yes; in India the net borrowing during those years was 10,990,779 *l.*

520. Will you give the Committee the amount which was borrowed in England?—In England we borrowed, in 1873-74, 2,105,000 *l.*; in 1874-75 we borrowed 7,479,416 *l.*; in 1875-76, we borrowed 1,200,000 *l.*; in 1876-77 we borrowed 5,600,000 *l.*; in 1877-78 we borrowed 4,280,000 *l.*; and in the present year, so far as it has gone, we have borrowed 222,084 *l.*; but I ought to mention that, in the year 1874-75, of the large sum borrowed here of 7,479,416 *l.*, 4,579,416 *l.* was applied to redeem the dividend on the capital stock of the East India Company, by which a very large saving was effected to the Indian finances.

521. Then, deducting that amount, will you tell us the total amount which was borrowed in England during the same period?—The amount borrowed was 20,886,500 *l.*, and deducting the 4,579,416 *l.* on account of the East India Company, the net amount was 16,307,084 *l.*

522. Therefore, there has been an increase in the public debt of India of upwards of 26,000,000 *l.* during the past six years?—Of 27,297,863 *l.*, exclusive of the amount raised on account of the East India Company.

523. What is now the total amount of debt of the Government of India, both in England and in India?—£. 137,000,000.

524. And during the time to which you have been referring there has been a disbursement on account of famine expenditure of upwards of 14,000,000 *l.*?—Yes.

525. The rule which the India Office have during the past year laid down, is that the money required for the construction of all Public Works Extraordinary should be borrowed in India?—It is.

526. But when a famine breaks out, such a reduction takes place in the cash balances in India, as to render it very difficult for the Indian Government to meet the drafts of the Secretary of State for India?—That is so.

527. And in consequence of that, in order to meet his liabilities, the Secretary of State for India has been forced to borrow in England?—That has been the case.

Chairman—continued.

528. Therefore, in that case, the rule for not borrowing solely in India has not been adhered to, because a considerable portion of the money which has been borrowed in England has gone to the prosecution of Public Works Extraordinary?—Quite so.

529. Therefore, however stringently you may lay down the rule, that no borrowing should take place in England for Public Works Extraordinary, you would find it very difficult to carry it out in most cases, because you would either be compelled to borrow the money in England, or else to cause a sessation of those works in India?—Yes; in fact, there appears to me to be but one way in which our orders could be carried into effect, and that would be, that when a large expenditure has had to be met, and when a loan has been raised in England to meet the expenditure on account of famine or otherwise in India, the first opportunity should be taken to return to the Home Treasury that amount which we, in fact, only intended to lend them. Unless that be done, when an emergency arises, calling for large expenditure there, they would not be prepared, except their cash balances were unnecessarily large, to provide for the expenditure in India, and to remit to us the money which we might require.

530. The general tendency, therefore, of famine expenditure, or any other exceptional expenditure in India, is to bring pressure upon the Secretary of State to borrow in England?—It is.

531. And when he has borrowed in England it is exceedingly difficult, considering the large annual remittances which have to be made, for the Indian Government to send any sum over and above those remittances in order to meet the loan which has been raised in England?—Yes; it is at times, and not unfrequently, impracticable to remit the amount required.

532. Of the loans which are raised in India, have you any idea what proportion has been taken up by natives, and what by European firms?—Yes; I have brought a Statement showing that. The proportion of debt in India held by natives has recently increased. The last account that we have is to the 31st of December last, and then the amount held in India by Europeans was 29,685,391 *l.*, and the amount held by natives was 14,883,083 *l.*; those figures only represent so much of the debt, the notes for which had been presented for payment of interest during the half year, and applying the same proportion to notes not presented for interest, it gives an addition of 10,422,000 *l.* to the European portion, and 5,225,000 *l.* to the native portion. Therefore there was held about 40,000,000 *l.* by Europeans, and about 20,000,000 *l.* by natives; that is a more favourable return as regards the proportion held by natives than we have had before; this return does not, of course, include the amount of enfaced paper which is in this country, and which we assume to be held by Europeans.

533. Of the more recent loans, as, for instance, the loan which was raised last year, have you any idea of the proportion in which it was taken up by Europeans and by natives; I do not wish to keep you to the exact figure, but to find out from you whether these loans are taken up to any extent by natives, or whether Europeans alone accept them?—In the year 1875 the natives

Chairman—continued.

tives took a large portion of one of the loans and offered more liberal terms than Europeans; it has not been the case more recently, the proportion taken by natives having been less.

534. As a rule, I assume that the European firms who tender remit home the interest on those loans to England?—Obviously, if the proprietors are in England, the interest is remitted home to them.

535. But you could not state that positively to the Committee?—I could not state that.

536. Therefore you are still strongly, I suppose, of opinion that it is expedient to borrow as much as possible in India if a loan is necessary?—I am very decidedly of that opinion.

537. And that whether the interest payable on those loans remains in India, or is remitted home to England, anyhow it is a transaction outside the cognizance of the Government, and is not to be included in the remittances which they annually have to make?—That is quite so; a loss by exchange is then incurred by the remitter on his private account; on what we remit we have to bear the loss by exchange.

538. As the demands of the Secretary of State are constant, and as the method by which he meets them is by public tendering, anything which adds to the amount he has to get from India naturally increases the difficulties of exchange?—No doubt every million added beyond a certain amount depreciates the exchange.

539. Mr. Danvers, in his evidence, called attention to a proposal which had come home from the the Indian Government suggesting that monies should be raised in certain localities or provinces on a guarantee, for the prosecution of public works. The Secretary of State did not assent to that proposal; will you give the Committee reasons for that?—The reasons were stated in the despatch which Mr. Danvers put in.

540. The proposal was practically this, that monies should be raised by the localities or provinces, and that the Government should guarantee a rate of interest of 4 per cent. through the medium of the provincial governments?—Yes; but when we came to examine the scheme, we found it to be simply this, that the securities to be given were to be exactly the same securities as those given for all the Imperial debt of India; they were to be securities of the Government of India, in the name of the Secretary of State in Council; and the Secretary of State therefore apprehended that this was to be outside the large amount which would otherwise be incurred for productive public works, and that it would also have an injurious effect upon our securities, because there would be the same security as for the Imperial debt, the interest would be 4 per cent., the rate at which we were borrowing, with the additional advantage, that the lenders would have a share in any profits which might be derived from the work for which the loan would be raised.

541. So that, practically, it was a renewal of the old guaranteed system through the agency of the local government?—Yes, and that although we should be issuing the stock at 4 per cent., it would be a preference stock, in fact, with advantages which our Imperial debt does not carry.

542. We have had it very strongly stated in evidence that there is a considerable difficulty in India felt on the part of the various local authorities in carrying on small public works, which would not come within the category of Public Works Extraordinary, or reproductive, and Colonel Chesney, in his evidence, in answer to certain questions which I put to him, expressed a strong opinion that some body should be established in India somewhat analogous to the Public Works Loan Commissioners here. Have you considered at all the possibility of carrying out any such proposal?—Yes, it has been proposed before, not I think in any official document, but it has always been felt that the absolute control over any sums raised must remain with the Government of India, and must form part of their cash balances. What advantage therefore is to be gained by setting up anything like a board which would be competent to exercise any power in regard to the amount which should from time to time be expended on these works I have never been able to see. A board might think it very desirable to make advances at a moment when the balances of the Government were very low, and some embarrassment might be caused to the Government thereby.

543. Therefore, inasmuch as the course from which these Commissioners, or this body, would have to advance would be the cash balances of the Government of India, you would be subject to handing over the control of any part of those cash balances to any body other than the financial department?—Quite so.

544. We have had a great deal of evidence as to the best agency by which public works can be carried on in India, and there is a complete concensus of opinion as regards irrigation works, that they must be undertaken by the Government. There has been some difference of opinion with reference to railroads, although it is admitted that the old guarantee system was somewhat extravagant, both as to the construction as well as to the working of the railroads which were made under it. An alternative proposal was suggested the other day upon which we examined Mr. Danvers, and that was whether it would be possible to raise capital on a limited guarantee from the Government, say of 2 or 3 per cent., the company having a certain portion or the whole of any profit over and above that amount which might arise upon the work which they had constructed; have you ever considered the feasibility of such a plan?—Yes, that plan has been considered, and it has its advocates, but I do not see what is to be gained by such a system. If you give a pecuniary interest to managers of a railway, that is, that they shall derive a considerable profit if it be economically constructed and worked, I have no doubt that is a great inducement to them to work economically, but I am unable to see why a railway should not be as well worked by Government officers, assuming they are sufficiently paid, as by directors of a company, who frequently represent little other than their own interests. I noticed from the replies of Mr. Danvers that after the first appointment of railway directors, they appear to nominate their successors, and a question being put whether, as in the case of the London and South Eastern Railway Company in this country recently, there was any canvassing among the shareholders for seats at the board, his answer was, No, and he admitted that practically there was none of that independence which exists among the shareholders of English railways. But this

Sir *T. L. Seccombe*, K.C.S.I., C.B.

20 March 1879.

Chairman—continued.

is a question upon which I have had no opportunity of forming any decided opinion.

545. Then I think you would not approve of any scheme by which the money would be borrowed in England, and the dividend paid in England?—I think it would be a great mistake.

546. Would you object to an attempt to carry out that scheme in India, by giving the local governments all the localities, or certain constituted bodies, a guaranteed interest upon the capital which they might raise for the construction of the works, assuming of course that the guarantee given was below the rate at which the Government of India could raise money?—If the interest guaranteed were much below that at which we were borrowing, it would not prejudice our own debt as it would if it were of the same amount with a prospect of advantage.

547. But speaking generally, you are not at present in favour of giving any companies who may wish to raise capital, any security other than the revenue or income which they may derive from the work constructed?—If you could induce natives to subscribe for the construction of a railway, and if you could be sure that the natives represented themselves and were not mere instruments for other persons, such as English capitalists, I think it would be very desirable to grant the natives liberal terms for any money which they might be disposed to expend, but unless you can do that, I think it has not been shown why it would be preferable to give a guarantee rather than to construct railways upon the principle of the State railways.

548. In the forms of accounts which were prepared by Colonel Dickens, a separation was made of the debt which has been incurred for Public Works Extraordinary, from the general debt of the Government of India; what would you do with the surplus on the ordinary account; would you apply it to the reduction of debt, or would you allow it to go in the cash balances?—The paying off a portion of debt while you continue to borrow, appears to me to be a proceeding which has no advantage attending it, and is disadvantageous, because you appear to be borrowers to a larger extent than you require.

549. But will not this difficulty arise, unless you lay down some such rule; I will assume there is a surplus, say in the present financial year, upon the ordinary account; that surplus, in the ordinary course of events, would go into the cash balances, and be at the disposal of the Indian Government for the in-coming financial year; it would be necessary to borrow a certain amount to carry on the Public Works Extraordinary; would it not be simpler to apply this surplus to the reduction of the debt other than that for Public Works Extraordinary, and then to borrow the whole amount from the public which you would require for the construction of public works and add that on to the Public Works Productive Debt?—If there were such a demand for our bills that any such surplus could be remitted to this country towards repaying the amount which we had raised here, that would be the wisest mode of applying it; if there be no such opportunity, then I think the only wise plan is, having taken care that your balance is sufficiently large, to allow the remainder to go in reduction of that amount which you would otherwise borrow.

550. But that is a matter of account; what would you do with this surplus; according to this account, all the money which is expended on a certain class of work is treated as borrowed money?—Quite so.

551. If you have a surplus on the ordinary account of the preceding year, that surplus would in England be applied to the reduction of the debt, but it goes into the cash balances in India. Now what are you to do with that surplus, if you do not apply it to the reduction of debt?—I would assume that we expend in a year 2,500,000 *l.* upon productive public works; any amount that was obtained from the cash balances would be treated as transferred to debt incurred for productive public works, so that in fact we should treat it as debt paid off for ordinary account, and incurred for productive public works.

552. Then, in fact, you would treat whatever sum came out of the cash balances as debt paid off from ordinary account, and transferred to the Public Works Extraordinary?—Yes.

553. Then to sum up your evidence, you would adhere to the rules which have been laid down, that only works of a productive or remunerative character should henceforth be constructed with borrowed money; that the amount so annually expended should be brought down to 2,500,000 *l.*, and that the most accurate account of all such expenditure should be given, in order that everybody may see what the exact results are, not only as regards the general expenditure upon these works, but also as regards each individual work?—I would, and with regard to that, I would like, with your permission, to read an observation of the Government of India in a Despatch dated in 1876, regarding the serious position in which we were placed by the fall in the price of silver. That Despatch strongly advocated the plan of limiting the expenditure on public works.

554. In fact, it expresses your views, only emanating from India?—It does, only more strongly than I have expressed them. The Government of India said, "We have also, in accordance with your Lordships' repeated instructions, resolved to reduce our expenditure upon public works classified as Extraordinary within the limit of the amount which we may find ourselves able to borrow in India on adequately advantageous terms. What this amount may be, experience only can decide; but we cannot prudently estimate it, even at the outset, at more than 2 or 2½ crores of rupees a year; and for a permanency, it may prove to be even less than this sum."

555. What is the date of that Despatch?—The 13th of October 1876.

Mr. *Childers.*

556. I think you stated that, in dealing with the debt, you would not divide it physically into two debts, one for general purposes, and the other for remunerative public works; but where you have a balance on your account which could be applied to the reduction of the liabilities of India, you would only make a book entry, crediting the general account and debiting the works account?—Yes, that would be on the balance sheet; there would be no distinction in the books other than that.

557. You would deprecate any raising of debt with one hand and paying it off with the other?—I think it would be unwise to do so.

558. You

Mr. *Childers*—continued.

558. You would deprecate the keeping of two classes of accounts, although you would advise making two entries in the books to show what was raised for remunerative purposes and what was applied to general accounts?—Quite so.

559. Passing to the question of the limited guarantee, did I understand you to say that, even if a company could be found to construct a railway from one point to another, which the Government deemed advantageous, without any guarantee at all, you would not like to see that railway constructed with English money?—No, I did not say that.

560. Will you be kind enough to explain your answer, because the purport of your answer went to that?—Until the Government is called upon to give a guarantee, it is in my opinion very desirable that English capital should be invested in India.

561. So far, therefore, as the exchanges are concerned, and the question of the amount of money which is to be remitted from India bodily to England, putting the distinction between commercial money and Government money out of sight, you see no disadvantage, but, on the contrary, great advantage, in as much English money as possible being invested in India?—Yes, I think that the advantages greatly outweigh any disadvantages which may arise from the annual remittances on all accounts to this country being increased.

562. Although the effects upon the council drafts would be the same?—I do not think that the effects would be quite the same. I think private individuals' remittances are not so conspicuously exhibited to the public as council drafts; we advertise every week for a very large amount of bills, and the public attention is given directly to those bills. I am quite aware that the balance of trade must greatly affect the question, and the rate of exchange at which the remittances are effected; but I believe the effect upon the exchanges of remitting 5,000,000 *l.* through private channels is very much less than of adding 5,000,000 *l.* to our drawings.

563. Then you consider that the rate of exchange does not depend upon the difference between the imports and exports, but upon the publicity which is given to the amount of the remittance?—No, I do not go so far as that; certainly the exchange is in a great degree dependent on the balance between imports and exports, and it is dependent also on the price of silver, which does not necessarily follow the Indian demand; but I certainly do not think that our Council drafts exercise such a very decided influence as you infer from my reply.

564. Have you formed, in your own mind, any estimate as to the difference which is produced upon the rate of exchange by the amount of the drafts being known only to bankers as they always are, or being known to the bankers, plus the public, which is the case with respect to Council drafts?—I am quite unable to form an estimate of the difference; I believe the difference to exist, but I could not say what it is.

565. Do you think it would be one-eighth per cent.?—I do not know, but I think that in times of great pressure the difference is more marked than it is when the pressure is not very great.

566. Therefore you do attribute some effect to the publicity, but you cannot measure even by one-eighth per cent. the amount of that effect?—No, I cannot. There is another consideration which weighs very much in the mind of the Financial Secretary in the India Office, and that is that the individual bears the loss in the one case, whereas in the other it falls upon the Government: the rate is affected by the aggregate; the charge to India depends on the amount we draw.

567. Then we may take it that if individuals combine to construct railways in India, with their own English capital, without asking for any Indian guarantee, you would rejoice to see railways constructed in that way?—Certainly.

568. Where then is the point where the Government comes in if the amount of the guarantee is practically so small as to be sure to be earned by the company; if, for instance, the guarantee is only 3 per cent., and it is practically certain that a company would only accept a 3 per cent. guarantee on the just expectation of reaching 6 per cent., and therefore would not come upon the Government at all, where does the influence upon the Government drafts begin?—That is a point on which I am unable to give any definite opinion. You will remember that in regard to the natives I should certainly be disposed to give them a guarantee.

569. I am speaking now solely of English money invested in India with a small guarantee, and I ask, if that guarantee is so low that practically the aid of the Government could not be invoked, how would that affect the exchange of Council drafts?—I have not intentionally given any opinion with regard to any effect upon Council drafts from such a course of proceeding as the construction of a railway with English capital. My objection in regard to giving a guarantee is that the Government should not make itself liable for securities which would carry with them a guarantee, plus a share of profit, and which would come favourably into contact with our own registered debt.

570. But if that is so, I do not quite see what the advantage would be in works of that kind being constructed with Indian money rather than with English money?—There is an advantage, a great political advantage, as I consider.

571. But I was asking you as a financial officer?—But in all these financial transactions we have always kept before us the fact that there is a great political element in getting the natives of India to invest their money.

572. The additional taxation of last year was proposed in order to produce altogether 1,500,000 *l.* a year to form a famine fund?—That was so.

573. The famine fund was so formed, because it was estimated that a sum of 15,000,000 *l.* would probably be expended upon famine purposes in 10 years?—Yes.

574. And it is the case, is it not, that the Finance Minister in India, in making that proposal, put it in this way: we may expect that within the next 10 years, judging from the past, we may have to expend 15,000,000 *l.*, to produce which, 1,500,000 *l.* a year should be taken from the revenue of India, and invested in reproductive works; and then when the call comes upon us we shall be able to charge that fund as it were with the special famine expenditure; was not that the basis of the transaction?—I think it was not quite to that effect; different views were given at different times with regard to the famine fund. Sometimes it was to be invested in paying

Sir *T. L. Seccombe*, K.C.S.I., C.B.

10 March 1879.

Mr. *Childers*—continued.

off debt which could then be incurred again; and undoubtedly if that had been English debt, that was the most certain way of securing a famine fund when a similar emergency arose; but if instead of being applied to paying off the English debt which had been incurred in order to meet the expenditure of the famine, 1,500,000 *l.* a year was expended in India on public works, or in preventing a larger sum being borrowed than would otherwise have been necessary, then certainly it would not be available when an emergency arises again, and the Government of India would have to come to the Home Government for relief.

575. But is not that exactly what Sir John Strachey clearly states in his great speech upon the subject, namely, that the 1,500,000 *l.* was to accumulate from year to year, not in the sense of being actually invested in works, but in the sense of diminishing the amount of debt raised, so that when the emergency came that diminution would be balanced by the special debt which had to be incurred?—Yes, somewhat in that form.

576. The form of the Government of India, that is the form in which they came to us, is it not?—They have admitted the general principle, that when they are aided by the Home Treasury in times of pressure, it is right that they should repay a portion of the debt so incurred.

577. But I want you not to complicate the matter with these two methods, because that might a little lead us astray. The principle is that there shall be funded 1,500,000 *l.* a year raised by special taxation, so as to be available for certain preventive or other works, upon emergency, to meet special famine charges?—Yes, a portion was to be so applied, that when another emergency arose it should be available; but then it is very important to bear in mind that it would not be available if expended on public works.

578. Instead of being expended on public works when it would not be available, it was to go in reduction of the expenditure on public works, and then the money could be raised when required?—Yes, and the reasoning would be sound if the Government of India were able, when an emergency arose, to provide for it in India.

579. You raise a fund out of this 1,500,000 *l.* a year which is supposed to be invested in that way, and that is mentally available, if one may use the expression, for a special emergency for which the additional taxation was justified?—Yes; but it must be remembered that the Secretary of State has expressly directed that one-half of that famine fund is to be annually remitted to this country to recoup the Home Treasury for these advances, which were made during the famine.

580. That is the point I see in your evidence, and I want quite to understand it. So far as Sir John Strachey's speech and the justification of the additional taxation goes, as I read it, the fund commenced last year, and was to be balanced by the probable expenditure of 10 years to come; but in the later Despatch which you gave us the other day, and which has just been printed, it would appear that half the fund is to be applicable to past famine expenditure, so that half the additional taxation is not to build up a security against the future, but to provide for the past; the question I want quite to understand upon

Mr. *Childers*—continued.

that is this, to what extent is that half supposed to be chargeable; for how many years is 750,000 *l.* a year to be paid to recoup past famine expenditure?—The Secretary of State having obtained authority from Parliament to raise money in this country on account of famine, and having borrowed that money, and relieved the Government of India of its expenditure, when additional taxation is placed on the people of India in order to form a famine fund, I consider that it is our duty to see that that famine fund should be really available; and if a million and a-half is the probable annual charge which may be anticipated on account of famine, that the very least we should require to be sent to this country is half of that amount, in order that it may accumulate here and be available whenever another emergency shall arise.

581. I quite understand that; but that is not an answer, if you will forgive me for saying so, to my question. In the Despatch it is quite plain; it is for the repayment of debt already incurred in famines, that is to say, to recoup past famine expenditure, that half of this additional expenditure is to be applied; but I ask you how long is that to go on?—Continuously. The liability to expenditure on account of famine is estimated at one and a-half millions a year, taking an average of 10 years.

582. That is not quite the point; the one and a-half millions a year was primarily to be applied to relief from famine, whether in the shape of preventive works, or in the shape of other relief expenditure. According to the Despatch, paragraph 18, the first claim upon the receipts is not for building up a fund for the future, but to repay the past famine expenditure, and the Secretary of State lays down that half the amount, 750,000 *l.* a year, is to be applied to repay past famine expenditure. My question is this: Up to what amount in the aggregate is that 750,000 *l.* a year to be applied to expenditure in the past, supposing there were no future expenditure?—Until the Secretary of State is repaid the amount which he borrowed in England for the relief of recent famines.

583. How much is that?—Since the year 1873-74 we have been borrowing continuously, and a great portion of the money borrowed has been on account of the famines.

584. But I want to get the figure. Here is a first charge upon the 1,500,000 *l.* a year: 1,500,000 *l.* a year is to be applied to the extent of 750,000 *l.* of it a year to recoup the expenditure in the past. How much expenditure in the past must be so recouped, and when will that payment cease?—It will only be recouped when the amount of which we have relieved the Government of India on account of their famine expenditure shall have been repaid.

585. But how much is that?—The famine expenditure during the last six years has exceeded 14,000,000 *l.* The whole of that amount has been furnished from the Home Treasury, and it is, I think, essential for us to show, that Parliament having been informed that no money shall be borrowed in England for Public Works Extraordinary, we have borrowed 14,000,000 *l.* for famine purposes.

586. If that is so, may we understand that of the 1,500,000 *l.* a year specially imposed for famine purposes, 750,000 *l.* has been imposed to recoup for something less than 20 years the 14,000,000 *l.*

Mr. *Childers*—continued.

14,000,000 *l.* raised for famine purposes in England?—I think it would be hardly fair so to put it. The reasons for the imposition were given by the Government of India, and by Sir John Strachey, and I think you will find that their reasons comprehended the reduction of debt to a greater extent than was implied in your former question.

587. I hope you will forgive my persistency; it is a point upon which we should be quite clear; I am asking you upon the 18th paragraph of the Despatch, which says that "the first claim upon these receipts being that of the Home Government, for the repayment of the debts incurred on account of famine, not less than one-half, 750,000 *l.*, should be available in these future years." My question is for what number of years, and for what total amount will that 750,000 *l.* be so payable, until the debt already incurred is wiped out?—It will be until the amount which was borrowed under the authority of Parliament for famine purposes shall have been recouped.

588. You have told the Committee that that would be about 14,000,000 *l.*?—Yes.

589. That is to say, it would take 18 or 19 years before that amount was wiped off?—It would.

Sir *Joseph M'Kenna.*

590. Does not the 14,000,000 *l.* carry interest?—Yes, the 14,000,000 *l.* we borrowed in England carries interest undoubtedly, but I apprehend that that would not be required by the Secretary of State in addition; he would be content with getting the principal.

Mr. *Childers.*

591. So far as this arrangement goes, which is described in the 18th paragraph, the Home Government do not want to be recouped out of the famine fund, but they do expect that, roughly speaking, 14,000,000 *l.* shall be repaid?—It has never been stated in any Despatch what the total amount shall be. The principle was laid down that towards the repayment of the sum borrowed three-quarters of a million should be annually held available.

592. At any rate, until that is repaid the whole amount available for future protective works, or for future ordinary famine expenditure, will only be 750,000 *l.* a year?—That will be so until a portion of the amount is repaid.

593. And according to this Despatch also, if I understand it rightly, no loans are to be raised for protective works?—That is so.

594. And if any protective works are constructed, they must be constructed out of the difference between 750,000 *l.* a year and the ordinary famine expenditure?—Yes.

595. So that, under this arrangement, the Government of India have finally decided not to borrow money for any protective works against famine whatever, but to limit the expenditure upon protective works to the difference between 750,000 *l.* a year and the ordinary famine expenditure?—Yes. I ought at the same time to mention that we were informed, indirectly, that the utmost amount which could be expended advantageously in the next five years, on protective works, would be 6,000,000 *l.*

596. But, in the next five years, if you only have 750,000 *l.* for protective works, and so on, you will not get anything like 6,000,000 *l.*?—If a famine should again arise, whatever amount the Secretary of State has been recouped would be applicable to meet the expenditure.

597. But that would not be in the shape of protective works?—No, it would not be in the shape of protective works.

598. My question is this: As you have only for six years 750,000 *l.* a year applicable, and as that only makes 4,500,000 *l.*, you will not be able to apply anything like 6,000,000 *l.* to protective works, but only the difference between 4,500,000 *l.* and whatever is taken for ordinary famine expenditure?—That would be from the Indian portion of the fund.

599. But the English portion is already mortgaged for 18 years for the past famine expenditure?—No, it would be a fund which would be available again if a famine should arise.

600. But it is mortgaged for 18 years, as I put it, for the expenditure which has been incurred during the past?—Yes, but any sum repaid would be again available.

Sir *George Campbell.*

601. Supposing that, under any circumstances, this past famine debt incurred by the Government of this country should be repaid, is it not quite possible that it might be desirable to continue to remit this sum to accumulate at credit on account of famine, for in case famine should subsequently break out, it would be impossible to borrow the whole amount in India; you would have to borrow it in England?—I think it would be the wisest possible course to continue that remittance to keep down the Home debt.

602. So that, in your view, that remittance should not be limited to the time when the amount advanced should be repaid, but should be a continuous remittance?—The annual remittance was based upon the average amount that would be continuously required, and therefore the 750,000 *l.* will be required permanently. I have a statement showing the surplus or deficit in each year from 1873–74, the two most recent years being estimated only, the amount expended upon productive public works, and the net amount borrowed in England and India. The net amount expended upon productive works in India during that period has been 25,341,000 *l.*, and of that amount less than 11,000,000 *l.* was borrowed in India; therefore, the amount borrowed in India was 14,000,000 *l.* less than the amount which they expended on productive public works in the six years.

Mr. *Childers.*

603. Then we may take it that until that 14,000,000 *l.* is recovered the 750,000 *l.* out of the 1,500,000 *l.* would be applicable to past expenditure?—Certainly.

Sir *George Campbell.*

604. I understand you to say that the works which are now classed as reproduction are works which are expected to pay from a commercial point of view; that they were such works as a private capitalist investing his money would consider to be remunerative to him; is that so?—That is to say, that no new work which will not fulfil those conditions is to be undertaken from the date of the receipt of the Secretary of State's Despatch.

 605. Then,

Sir *T. L. Seccombe*, K.C.S.I., C.B.

20 March 1879.

Sir *George Campbell*—continued.

605. Then, would you not consider that works not directly remunerative from a commercial point of view, but which might be remunerative in the sense of increasing the productive wealth of the country, would come within the limit of the works which are to be met from this Public Works Extraordinary Loan?—Certainly not.

606. Is it not the case that the Government have desired to adopt a form of account of such a character that in regard to works both separately and in the aggregate, it should be made clear whether they are or are not productive in the sense I have just put to you?—It is.

607. Is it your opinion that the Government have yet succeeded in devising any such form of account?—Yes; with one exception, that it does not include the interest while the works are under construction. I think that, with that exception, the account which has been placed before the Committee, the form of which was prepared in the India Office, will answer the purpose.

608. Is not that omission of the interest upon works under construction a very important omission?—Certainly.

609. Is it not the case that a capitalist considering whether an undertaking would be remunerative or not, would certainly take into consideration interest during construction?—Certainly, it would be added to the capital.

610. Is it not the case that many of these works have been long under construction and not remunerative, and that in their case the accumulated interest comes to a very large sum indeed?—No doubt.

611. Is it not the case that an account of that accumulated interest exists, and that up to a comparatively recent period it was included in the accounts which were made up by public authority?—In the accounts for the year 1875–76 such a statement was included, but it was a very imperfect one.

612. Do you think it would be difficult to compile such an account with approximate accuracy?—It would be a work of some labour, which of course should be given to it; the object is sufficiently important to justify the employment of much time upon it; and it could then be put in as an approximate statement.

613. Is there, in your opinion, sufficient ground for the course which is taken of omitting interest, during construction, from the accounts submitted to Parliament?—I regret that it was omitted. As that form was first prepared in the India Office, it did include a column for the interest; but it was struck out, partly because it was felt that at the present time the account was sufficiently complicated without it, and it was thought that it would be better to give it in its present form.

614. Was it at the instance of the Public Works Department that the column for interest was struck out?—It was at the instance of a gentleman who took part in the preparation of the form of account.

615. Was the gentleman you alluded to connected with the Public Works Department?—He had been.

616. Is it not the case that, in regard to such a work as the Ganges Canal, this question of interest is so large that the inclusion of the interest would almost diminish by one-half the amount of profit which is now received from that canal?—Probably it would.

Sir *George Campbell*—continued.

617. There is another question which I should like to ask you in connection with this account. Have you considered and formed an opinion whether taking the definition of a productive work, upon which, I think, you and I are agreed, it is right to include in the accounts what are called the indirect profits of those works; that is to say, the profits not directly received, but the profits which are calculated to be received indirectly in the shape of an addition to the revenues of the country?—It certainly is very important to ascertain, if it be practicable, what proportion of indirect revenue is attributable to the works; otherwise their commercial character cannot be clearly seen.

618. Then with regard to that I must put two questions to you. First, whether it is practicable to ascertain the amount of that indirect benefit; and secondly, if it is ascertained, however desirable it may be to have this information, whether treating the works as commercially reproductive the amount may fairly be included. Now, first as regards the practicability of ascertaining this amount; you are probably aware that in the country through which the Ganges Canal runs, lines of railway have also been constructed during the same period of time. Do you see any means by which it is possible to distinguish between the difference in the resources of the country made by that canal and by the railway running alongside of that canal?—No doubt it would be exceedingly difficult to make any such distinction, but if the Revenue and Public Works officers were to agree, I think we might reasonably accept their decision as an approximate one.

619. But speaking as a financier, is it not the case that, after all, this must be a matter of opinion, and not a matter of exact calculation?—Certainly; it would be idle to suppose that we could obtain an exact account showing how far past works have been remunerative or otherwise.

620. Then while you are unable exactly to apportion the amount of indirect benefit, would it be right to include that indirect revenue, inasmuch as the capitalist could not be expected to derive that profit?—I should not take so rigid a view as that.

621. I think you have already expressed your opinion that the works constructed by natives before the British rule, in respect of which only a moderate expenditure has been incurred by the British Treasury, are not fairly classed with the productive works which have been made entirely by British money?—They ought not to be classed together, unless you can fairly assess the value of the works that we succeeded to.

622. Is it the fact that under the head of Reproductive Works, only railways and irrigation works are now included?—Yes, that is so now. Bombay Special Fund Works were included in the years from 1867–68 to 1869–70.

623. Will you explain to the Committee under what head is now classed the expenditure upon such works as the Madras Harbour, the Bombay Shore, the Bombay Docks, the Hooghly Bridge, advances to municipalities, and other matters of that kind upon which a large expenditure has been incurred?—Advances to municipalities are shown in the accounts under that head. The advances for the Madras Harbour Works were, in the last accounts, included among advances repayable.

624. What I want to know is, whether when the accounts

Sir *George Campbell*—continued.

accounts of the Revenue and Expenditure of India are presented to Parliament, these expenditures, which I have mentioned to you, are treated as expenditure for the year under any head whatever?—No; the interest which we obtain from the advances is included in our annual account.

625. But none of them are included as expenditure either under the ordinary or the extraordinary head of the Indian Government accounts?—No.

626. Does not that lead you to this, that while we are told that we are only borrowing for two particular classes of works called productive, we are really borrowing for large classes of works to which there is really no limit whatever?—I think in your evidence given before this Committee, if I remember rightly, you informed them that, in regard to these works, they were constructed from advances made by the Government to municipalities, and you also mentioned what I was not previously aware of, namely, that a sinking fund was provided to repay the sums.

627. But what I want to know is your opinion as a financier, whether if we are to have any check over the borrowing powers of the Government of India, if we are to limit those borrowing powers to particular works and particular amounts, this system of making advances for other works which are not included in the accounts of expenditure, does not open the door to unlimited expenditure?—It is open to the Secretary of State, or to Parliament, if they find that the advances to those municipalities are increasing very largely year by year, to call upon them to restrict, or to discontinue those advances, but it would be quite erroneous to include in the account of the Government of India, the expenditure which is incurred by municipalities from advances made by the Government on which the municipalities pay interest, and for repayment of the principal of which a sinking fund is provided.

628. But as a matter of fact, do not these advances increase the amount which it is necessary the Government of India should borrow from year to year?—Yes.

629. And therefore, is there not a certain fallacy in the accounts presented to Parliament, which seem to show that the Government of India has only borrowed, say 5,000,000 *l.* for public works, when it may be that in this indirect manner not only in the shape of municipal advances, but advances to local governments, 10,000,000 *l.* may have been expended?—The accounts of the Government of India show clearly what the total debt has been which they have incurred on all accounts.

630. Do not you think it would be desirable that this particular head of money borrowed in order to make advances for works by local governments or municipalities, should be put under a separate head?—The account of the advances made to them, when compared with the general account, shows whether the advances have been made from borrowed money.

631. But is there any head which distinguishes advances for public works from advances for any other purpose?—No; when the Government of India borrows, it borrows generally in the form of one loan during the year, and that is for all its necessary requirements.

632. Would it not be desirable to know how much has been borrowed for the purpose of public works, and how much has been expended for the purpose of public works?—During the year, no doubt, such an account could be added if it were thought desirable.

Sir *George Campbell*—continued.

633. Is not the present rule liable to this abuse; supposing the Government of Madras recommended the Government of India to construct expensive works, costing, say 2,000,000 *l.*, and the Government of India say we cannot do this; the orders of the Home Government are strict that we may only construct certain public works from borrowed money, and those must be productive works, either railways or canals, whereas this proposed work of yours does not come under this head, and we cannot consent to construct it with borrowed money. Might not this rule of the Home Government be circumvented, as it were, if the Government of Madras were to return to the charge, and say, we will not ask you to construct these works, but we will ask you to lend us a couple of millions for the purpose of constructing them?—Any such proposition would be reported to the Home Government, and it would rest with them to decide whether the reasons given for it were sufficient.

634. Is there any rules as regards advances for public works, and the amount which may be advanced without the sanction of the Home Government?—No; sanction was given by the Secretary of State to the Act of the Legislative Council of India, which provided for those advances, and that being done no further sanction is absolutely necessary on the part of the Secretary of State; but in the event of such a proposition as you refer to, namely, of two millions being required in that way, I can hardly imagine that the Government of India would not report it; even if it were not reported it would attract attention when the head of "Advances" was examined.

635. Supposing the Home Government of India were extravagant and inclined to go beyond their rules, such a thing as I have suggested might be possible?—No doubt it might be so.

636. In any case it cannot be said that money is borrowed only for two classes of public works; in fact, through the system of advances, money is borrowed for other classes of public works, is it not?—Money is borrowed to be advanced to municipalities, but not for any other public works constructed by the Government itself, except railways or irrigation works.

637. Or to be advanced to local governments; are you aware that at one time the cash balances of the Government of India were so large that they were inclined to advance to municipalities in order to get rid of their cash balances?—The cash balances were very large some years ago, undoubtedly.

638. May it not happen, on the other hand, that the cash balances may be depleted to an inconvenient degree by a practice of this kind?—It is possible, if we assume great want of judgment on the part of the Government of India.

639. I understand you to have stated that, in your opinion, most of the great public works undertaken in the last 30 or 40 years have not been productive in the sense of being commercially remunerative?—I have.

640. You think that that is especially so as regards irrigation works?—With certain exceptions.

641. Then with regard to railways; if in the

Sir *T. L. Seccombe*, K.C.S.I., C.B.

20 March 1879.

Sir *T. L. Seccombe*, K.C.S.I., C.B.

20 March 1879.

Sir *George Campbell*—continued.

case of the great lines of guaranteed railways interest during the construction is taken into account, do you think that the principal and the best of those railways may be now taken to be commercially remunerative?—I have had no opportunity of forming an opinion upon that point beyond that which the papers, which are received and which are regarded as accurate in the office, have afforded me; it certainly appears that some of the railways are now commercially remunerative.

642. Is it not the case that of late years the East India Railway has been commercially remunerative?—It now appears to be commercially remunerative, and may be expected to continue so.

643. In round terms you are not prepared to dissent from the general opinion that the principal railways are likely to be commercially prosperous?—I think they are, but it would be presumptuous for me to give a very decided opinion on that point.

644. Have you any information with reference to the class of works upon which the Extraordinary Loans of the past three or four years have been expended?—No other than that which is apparent in the finance accounts.

645. Then am I to understand that the Financial Department exercises no check over this expenditure with the view of seeing that the financial rules and safeguards limiting the character of these works are observed?—The Financial Department of the India Office does not. The administrative portion of the work relating to railways is in the Public Works Department. The proposed Despatches which sanction any of the undertakings when they have passed the Public Works Committee, are referred to the Finance Committee, and are there considered previously to being placed before the Council, but the Financial Department has no control over the works.

646. In what department was the Despatch issued in which the Government of India were required to construct no works from borrowed money beyond certain limits?—That was in the Financial Department.

647. Do not you think that there is some necessity for ascertaining that the Financial Department have had their own orders complied with?—Yes, when we have obtained the accounts in a complete form it will be easy to see whether the orders have been observed, but until we get those accounts, it is not practicable.

648. Am I to understand that up to the present time, as regards the faithful execution of those orders, there has been no control in the Financial Department of the India Office?—Up to the present time it has been more a matter of discussion as to the principle to be observed, than whether it had been carried out or not.

649. Up to the present time the expenditure has been between four and five millions in each year, and the Financial Department has exercised no check to ascertain whether the works upon which the money has been so expended are really within the compass of the Financial Despatch or not?—No.

650. Now am I to understand you to say that even if you were quite assured that the works which the Government of India might undertake to a large extent, say to the amount of 10,000,000 *l.* or 12,000,000 *l.* per annum would

Sir *George Campbell*—continued.

be profitable, you would be against borrowing money to carry out such profitable works?—That question implies a state of things very different from that which exists; the sound principle, as I believe, which should govern the undertaking of these works is, that the money should be raised in India; consequently the amount which can be raised there is the limit as to the money to be obtained for constructing the works; I believe you could not safely assume that more than two millions and a half annually could be borrowed in India on reasonable terms, and therefore it would be exceedingly unwise to authorise them to construct works to a larger amount, as it would inevitably fall upon the Home Government to supply what might be deficient.

651. Then I would ask you whether it has occurred to you to consider this view, which I think has been often presented to the public, that is to say, seeing that our own colonies and almost every other country in the world receive very free supplies of British capital, why under those circumstances would you prevent India from receiving a similar supply of capital from this country?—India has received an immense amount of English capital within the last 30 years, and like the case of an individual improving his estate, there might be many things which would pay him very well to have done; many improvements might be made, but he would have to obtain the money for the purpose of executing them at too high a cost. Indian credit has stood very high for many years, and it has been second only to that of the British Government. A change, however, has now occurred, and I think unless great care be taken with reference to increasing the amount of Indian securities in India as well as in England, you will find that the rate of interest for money borrowed, will be such, that it would be very unadvisable to construct public works under the expectation that they will be commercially remunerative.

652. Can you at all explain why it is in your view that private investors seem to have been so ready to invest their money all over the world, rather than in India; why it is that there is scarcely a bankrupt State in either hemisphere in which our private investors have not advanced their money almost to a lavish degree, and yet at the same time there seems to have been an extraordinary disinclination to undertake enterprise in India without a Government guarantee?—The temptations which India has afforded, have not been so great in the eyes of the British public as those which have been afforded in other directions. As I said before, a very large amount of British capital has been invested, nearly 100,000,000 *l.*, in Indian railways under a guarantee, and the public have lent very freely to the Indian Government. You can only get the market to take a certain amount of Indian securities, and many of those countries to which you refer have held out higher rates of interest and greater inducements.

653. But still, do you not think there is something extraordinary in the degree to which, as I have said, British money has been lavished in almost every bankrupt country in the world, and yet, without a Government guarantee, has not been expended in India? Is it not to some extent the case that our capitalists have been in a measure debauched, if I may use the term, by

Government

Sir *George Campbell*—continued.

Government guarantees; that they will not advance the money without a Government guarantee, whereas if they had been left to themselves to some extent as they have been in other countries, seeing that they have in India British Government, British security, and British management, if circumstances such as these to which I allude have not had their effect upon the market, we might reasonably expect that more money would have been invested in India, without the intervention of Government?—Until recently Indian railways have not paid more than the amount of the guarantee, and some of them have not yet done so. The securities of the Government of India have of late years only yielded 4 per cent., and that has not been a sufficient attraction to the public.

654. Then I understand you to have given as a reason for not increasing the amount of money owed by India to England, not only the ordinary financial and political reasons, but also the bad effect which is produced on the rate of exchange by the necessity of remitting excessive amounts. Now what I wish to ask you is, in order to ascertain whether the rate of exchange is really very adversely affected by those circumstances, first, what is the intrinsic value of the rupee in sterling at this time, when silver is about 49 pence per ounce?—Without pretending to be strictly accurate, about 1 *s.* 6 *d.*

655. Then is it the case that the exchange at this moment is less favourable than what I might call the natural rate of exchange, taking the natural rate of exchange to be the relative intrinsic value of the sovereign and the rupee?—One element in considering when the exchange is too low is, what the out-turn of a bullion remittance from India would be. You would not then obtain for it the full value of the silver, because it would be subject to 1 or 1½ per cent. for transmission and insurance.

656. But still, am I to understand that when the Secretary of State now draws upon India, he receives the full intrinsic value of the silver contained in the rupee?—Yes; as the rule, something better.

657. Then as a matter of fact, the exchange is not less favourable than what I have called the natural rate, but is still somewhat more favourable than the natural rate?—It is hardly right to call it the "natural rate" according to the price of silver at any moment. The natural rate would be the price of silver, taking the average for several years, and that would be considerably above the present rate.

658. Am I to understand that, taking the average of several years, it will generally be found that the Secretary of State, in drawing upon India, has received less than the intrinsic value of the rupee at the time when the draft was made?—No, as the rule, rather more, because you cannot place a rupee in India, without adding to the value of the silver which it contains, the cost of freight and insurance on its transmission to India plus 2 per cent. for coinage.

659. Then I am to understand from what you say that, putting aside the intrinsic value of the two metals, the state of the import and export trade of India is rather favourable to the party drawing on India than otherwise?—Favourable, if you take the price of silver in the rupee, and not otherwise.

660. Putting the matter in the other way, does a man who draws a bill in India upon England get the full value of the rupee in England, or does he get less?—He gets the value of the rupee in England.

Sir *George Campbell*—continued.

661. But does he get an amount of silver equal to the intrinsic value of the rupee?—Yes, as a rule.

662. I understand, for the reasons which you have given, that the policy of the Government for some years has been, and now very strongly is, to borrow in India rather than in England?—It has.

663. And you think that prudence would dictate that the amount expended on public works should be limited to the amount which can be borrowed in India, and you have stated that you think the amount must be limitted to 2,000,000 *l.* or 2,500,000 *l.* sterling per annum. Now, I will ask, do you think we have fairly tried what we can really raise in India, that we have tried by the best methods, and to the utmost, to raise loans in India?—It has very often been thought that a great end would be attained if we could induce the natives of India to lend from their hoards what capital they may possess; that we should thereby not only obtain a considerable amount of money, but we should add to their comforts, and we should also accomplish a great political object, and I know, from conversation with yourself and with many other distinguished servants of the Indian Government, that they have been fully alive to the importance of the subject in that direction; but any proposition must, I think, come from India, it could not be suggested as well from this side except by means of personal communication. No scheme has yet been proposed which would be likely to accomplish the great object in view.

664. The point at which I am aiming is this: I think you are aware that there is a very radical difference between the mode of borrowing in England and the mode of borrowing in France; that in England the habit is to appeal to great capitalists, who are invited to tender for loans, whereas in France the habit is to appeal to the small lenders; to the people; and, I think, I may say, almost as a matter of fact, that in France that system is very successful, and that the people do very largely contribute towards the loans which the French Government have occasion to raise. Now, is it not the case that in India, of late years, the English system has been adopted absolutely, and that at this moment the Government of India, in attempting to raise a loan, have not appealed to the people at large, but have confined their mode of raising a loan to a system of public sealed tenders at Calcutta to be sent in on a fixed day, and in all respects strictly according to the English method?—It is.

665. When was the mode of offering by tender introduced into India?—It had been the practice of the East India Company to borrow in India by means of open loans, and money gradually filtered into the Treasury. Subsequently that system was condemned. I remember its being described as the "profligate system of open loans." The East India Company never had power to raise in England more than 7,000,000 *l.*, and that was by the issue of bonds, and they hardly ever exceeded 4,000,000 *l.*; but when large sums were required in this country consequent on the mutiny, it was thought,

Sir *T. L. Seccombe*, K.C.S.I., C.B.

20 March 1879.

Sir *T. L. Seccombe*, K.C.S.I., C.B.

20 March 1879.

Sir *George Campbell*—continued.

and I think wisely thought, that they would be obtained on better terms by inviting tenders for debentures or for stock. A change was therefore made; we have not always adhered to it, because when we have had power to borrow we have at times obtained considerable sums by selling stock without advertising a loan.

666. That is to say in England?—Yes, in England; in India they followed the same course; they considered that it would be better to invite tenders for their loans, and in some cases it answered well. In the years 1874 and 1875 they obtained very favourable terms, being between 102 and 103 for 4 per cent. stock.

667. But was not the term "profligacy" applied to the system of open loans in respect to the unlimited power of borrowing which it seemed to imply, and not to the mode in which the loans were raised, supposing it were necessary to raise a certain sum of money?—It was applied to the open loans. It was alleged that whether we wanted money or not, we were always keeping a loan open, and that that led to wasteful expenditure.

668. But it was not in other respects the system of appealing to every treasury in the country which was considered wasteful and extravagant?—No.

669. Now I want to ask whether, in your opinion, of late years this system of taking up loans by tender has been generally successful; whether, considering the limited number of capitalists in India, there is not some danger of combination among them, and whether it is not the fact that as respects the last two or three loans which have issued the value of those loans has invariably risen several per cent. in the market immediately after the Government have made their bargain?—Yes, it is open to question whether the plan of inviting tenders for a loan in India is at all times the best.

670. Have you had occasion to observe in the case of the last two or three loans, whether the Government have really got advantageous terms, or whether, in fact, they have been obliged to submit to terms less advantageous than had previously prevailed in the market, and considerably less advantageous than prevailed in the market immediately after the loan had been effected?—Yes, generally the terms which they have obtained have not been so favourable, but that is not uncommon. It occurs in this country as well as in India.

671. Is it not the case that, even in the great London money market, there is some risk that there may be a great deal of trades unionism and combination amongst capitalists?—No doubt.

672. Do you think that, with regard to bills drawn on in India, the Government always get the most favourable terms the market will admit of?—I have never seen any sufficient reason to believe the contrary.

673. At all events, do you not think that a comparatively small money market, such as the Indian money market, is distinctly liable to the danger of combination?—Peculiarly so, no doubt.

674. Do you think it would be possible to combine the system under which the open loans were formerly raised, with a limitation to the total amount which the Government were authorised to raise?—No doubt it would be possible, but still very difficult.

Sir *George Campbell*—continued.

675. Do you think there would be any practical difficulty in the way of opening the Government treasuries all over the country to small lenders who might be willing to lend their money to Government after the French fashion?—So far as opening the treasuries to subscriptions to a loan goes, there could, I apprehend, be no great difficulty; the Treasury officers can be relied upon, and therefore it might be done; still, alive as the Government of India are to the importance of obtaining subscriptions from natives, I conclude that they have never yet been able to satisfy themselves that they could devise such a plan as you suggest.

676. Do you not think that public officers and others are sometimes a good deal wedded to the old grooves, and that it might be somewhat difficult to induce the Financial Department of India to depart from a practice on which they have taken their stand?—The Financial Department of India departed from the system of open loans, which was a tradition in India, when it appeared to be desirable; and I think they would be quite ready to change again.

677. Was not it the case that under the old system of open loans a great deal of money came in by driblets to the Treasury at a very low rate?—It did.

678. You stated in the early part of your evidence to-day that you had reason to believe that a larger portion of the debt of India was now held by natives in India than in former days; have you thoroughly sifted and gone into that question?—I have the particulars for several years showing that there has been an increase of such holding.

679. Will you be so good as to state to the Committee what years you have compared?—I have taken from 1868 to 1878. The debt in India amounted on the 31st December 1878 to 76,860,528 *l.* Of that sum there had been presented for interest, during the previous half-year, 29,685,391 *l.* by Europeans, and 14,883,083 *l.* by natives. Applying the same proportions for notes not presented during that period, there would be 10,422,327 *l.* held by Europeans, and 5,225,343 *l.* by natives, making 40,107,718 *l.* held by Europeans and 20,108,426 *l.* by natives. The remaining portion of the debt, 16,644,384 *l.*, consisting of notes enfaced for obtaining Interest Bills in England on the Government of India is doubtless held by Europeans.

680. Is it not the case that in former days, in the days of open loans, and in the days before the mutiny, in reality the natives held a very much larger portion of the debt than they do now?—I believe so; but the returns received from India prior to the mutiny are very incomplete.

681. But from such information as you have, you have reason to believe that in those days a very much larger portion of the debt was held by natives than is held by natives at present?—I think it is probable, because the money came in in smaller sums.

682. Is there not some fallacy in the statement you have put in, inasmuch as you tell the Committee that under the modern system of enfacing the paper for payment in England, you have excluded the whole of that enfaced paper; is it not to be expected that a very large portion of Government paper held by Europeans is now enfaced for payment in this country, and, therefore,

you

Sir *George Campbell*—continued.

you have withdrawn a large amount of that held by Europeans from the comparison as compared with the amount held by Europeans in former years?—But still, even if you add all that portion held by Europeans, the proportion held by natives has increased since 1868.

683. Can you give the Committee the figures for that?—In the year 1868, the amount held by natives was 14,700,000 *l.*; in 1869 the amount held by natives was 14,600,000 *l.*; in 1870 it was 13,300,000 *l.*; in 1871 it was 16,200,000 *l.*; in 1872 it was 14,900,000 *l.*; in 1873 it was 16,500,000 *l.*; in 1874 it was 17,100,000 *l.*; in 1875 it was 17,400,000 *l.*; in 1876 it was 17,800,000 *l.* I have not the return for 1877; and in 1878 it was 20,100,000 *l.*

684. I think you said that 14,000,000 *l.* was actually presented as held by natives, and that 6,000,000 *l.* was the proportion of the paper which was not presented but which was taken as held by natives?—Yes; this account is made up to the 31st December 1878, and the amount which had then been presented within the half-year for payment of interest was 29,685,000 *l.* as held by Europeans, and 14,883,000 *l.* as held by natives.

685. What is the nature of the paper which is not presented?—Paper in the hands of holders who have not sent it in for dividend.

686. Surely there cannot be a very large proportion who have not drawn their dividends?—Yes, who had not drawn them at that time. The loans run from different periods; and the dividends are payable at various dates.

687. As I understand, the total held by natives had increased from 14,000,000 *l.* in 1868 to 17,000,000 *l.* in 1874?—Yes.

688. And it has increased to 20,000,000 *l.* in 1878?—Yes.

689. Do you think that 20,000,000 *l.* is a safe figure?—I think perfectly so.

690. Do you know by whom the statement is made?—This is the return furnished to us, and which has recently come to hand as regards the last year.

691. Will you hand that statement in?—I will. (*The same was handed in.*)

692. The total amount of the debt of India between 1868 and 1878 has increased in at least as great a proportion as the amount of native holding, has it not?—The debt has increased from 62,000,000 *l.* to 76,000,000 *l.*; that is the total amount of debt in India, including the enfaced paper.

693. I think you stated that in one of the loans a large proportion was taken by natives upon more favourable terms than in more recent loans?—That was so.

694. Was that really an investment by natives, in your opinion, or was it only the native bankers taking up the loan in larger amounts than they had been in the habit of doing, in order to put it on the market?—We have no means of ascertaining in this country who took it up.

695. Do I understand that beyond borrowing for productive public works, you would be distinctly against borrowing for improvements which are not of that productive kind; for instance, for such a case as that in respect of which a loan was raised in England, namely, for the defences and fortifications of the country?—We resisted strenuously borrowing for barracks, which was a very pressing necessity after the mutiny, and I think we did so wisely; I do not think that Indian finance will bear borrowing for productive public works, and also borrowing for other works considered to be necessary.

Sir *T. L. Seccombe*, K.C.S.I., C.B.

20 March 1879.

696. Is that answer, then, given with regard to the present state of the Indian finances; supposing we were in this position, that we had a considerable surplus of revenue, from which it would be possible to establish a sinking fund, would you consider it would be imprudent to borrow money in order to make great public works which were clearly beneficial to the country, though not immediately reproductive?—If you had a considerable surplus revenue which would be available for the purpose without borrowing, surely that would be sufficient for your object.

697. It might very well happen that you might have a million or two of surplus revenue, and you might be desirous of constructing great public works which would cost 20,000,000 *l.* or 30,000,000 *l.*; I would ask under those circumstances, whether you would consider it prudent to borrow for works for the general benefit of the country?—If I were responsible for the finances of India, I certainly should not like to do it.

698. I should wish now to ask you a question or two with regard to the famine fund, which was a fund established as a surplus fund in order to provide against famine contingencies; I understand Sir John Strachey's calculation to have been this, that the expenditure upon famines might be calculated to amount upon an average to about 1,500,000 *l.* per annum; is that so?—He estimated that 1,500,000 *l.* per annum upon an average was not a larger amount than, judging from our recent experience, it was necessary to regard as the probable expenditure during 10 years.

699. Does it seem to you that sufficient provision is made for this expenditure of 1,500,000 *l.* when we are told that 750,000 *l.* is to be accumulated in cash, and that the other 750,000 *l.* is to be expended upon what are called preventive works?—We are placed between two fires. We have on the one hand the Public Works Department and the Government of India urging strongly that, by the judicious expenditure of a comparatively small sum upon protective works, not only could you get some income from those works, but that famine would be disarmed very much of its terrors; on the other hand we, having power from Parliament to raise money, have used it; and I think Parliament might say to us, if we came for fresh power, what have you done with that which we previously gave you; you have expended the money raised for relief of famine nominally, but although the people of India have been taxed to the amount of 1,500,000 *l.* a year to supply a famine insurance fund, no portion of that fund has come back to repay you what you advanced on account of famine, but it has been applied to public works. Therefore, I think the Secretary of State has adopted a wise course in insisting that, if it be practicable to obtain it without serious loss in the mode of remittance, one half of the famine insurance fund, instead of being applied to keep down debt in India, should be remitted to this country to recoup us the amount which we advanced.

700. I quite understand and appreciate what you

Sir *T. L. Seccombe*, K.C.S.I., C.B.

20 March 1879.

Sir *George Campbell*—continued.

you have said as regards the two fires and the Public Works Department; what I wish to put to you is, apart from the fire of the Public Works Department, whether it seems to you that Sir John Strachey's plan of raising 1,500,000 *l.* a year to meet a total expenditure of 15,000,000 *l.* in 10 years is consistent with his plan of spending that money upon preventive works, and whether, looking at it from a financial point of view, the Secretary of State was not bound to go a good deal further than he has, and to say, not only if circumstances admit of your remitting 750,000 *l.*, you must do it, but also if circumstances require you to put aside 1,500,000 *l.*, you must do it?—We must in this country accept the assurances of the Government of India upon certain questions, such as those connected with protective public works. If they say that in certain districts there is a great want of water or of means of communication, which, when a famine occurs, renders it much more difficult to deal with it, and thereby entails upon them a very considerable expenditure, and that a sum of about 6,000,000 *l.* might be expended in five years upon works of that nature, which would indirectly, if not directly, repay us, I think it would be an exceedingly strong measure on the part of the authorities in this country to say to the Government of India, we are not satisfied of the wisdom of the course you propose, and insist upon more than half of that famine insurance fund being remitted to us in repayment of the money which we have advanced to you.

701. Let me put it in this way; you have told the Committee that about 14,000,000 *l.* have been expended on famine works in the last few years. I want to know whether, under the present arrangements, you see any prospect of that 14,000,000 *l.* being recouped?—No, there is little chance of our getting anything like 14,000.000 *l.* recouped before some further claim for aid will again arise.

702. And supposing we have famines in the next 10 years involving equal expenditure, do you see any prospect of that expenditure being met as things now stand?—To a certain extent; if we receive annually the 750,000 *l.* the accumulated amount would be available to meet a future famine. I think it is important that the Government of India should understand that they must depend upon themselves more than they have done in regard to borrowing in cases of emergency.

703. But what I want to put to you is this; taking Sir John Strachey's own views of the matter, taking the fact that 14,000,000 *l.* have been expended on famine within the last six years, and that according to his calculation, they would be likely to be obliged to spend 15,000,000 *l.* more in the next 10 years, I would ask whether, as matters are now arranged, this famine fund is likely to meet and satisfy that expectation?—If an expenditure of 15,000,000 *l.* be required during the next 10 years on account of famine relief, whatever sum may have been remitted to this country would be available, and if half the famine fund had been remitted 7,500,000 *l.* could be applied towards relief; the other half of the fund may have been spent in India in protective works; and if those works are not remunerative in the sense of protecting us from the consequences of famine, the deficiency should be supplied by borrowing in India.

Sir *George Campbell*—continued.

704. At all events the cash remitted, namely, three quarters of a million, liable to interruption and likely to be interrupted, will not be likely to meet the whole of those requirements?—Certainly not, if we are to have a famine again so serious as to involve an expenditure of 15,000,000 *l.* in 10 years.

705. You have also told the Committee that, as a matter of fact, since this Famine Insurance Fund has been established, the money has been available neither to recoup past expenditure, nor to meet future expenditure, but has been expended in other ways?—I am not aware whether the Government of India has expended any on protective works; I have no information upon that point.

706. You have not seen anything of the money?—I have not.

707. Do not you think it would be practicable to establish trustees in the position of the National Debt Commissioners in this country, who are, I believe, in the habit of constantly lending the funds of friendly societies and savings banks which come into their hands to the Government; and that this famine insurance fund should be committed to the hands of that body year by year, it being permitted to them in years when they had not occasion to expend the money upon famine, to lend it to the Government in other departments, just as the National Debt Commissioners do habitually lend their funds to the Government of this country?—It would be, no doubt, possible to establish such a body. Whether they would be public officials, as the National Debt Commissioners are in this country, or whether they would be other than Government servants, I think in either case it would be exceedingly unwise to give to a body so constituted powers to borrow independently of the Government. Such an arrangement would be exceedingly inconvenient to the Government of India; they might be wanting money when the Commissioners could spare it, but might refuse to do so; it would in fact be locking up a portion of the cash balances in a way which does not appear to me to offer any probable advantage.

708. Are you aware that the National Debt Commissioners do, as a matter of fact, exercise functions of that kind in this country, and that the Chancellor of the Exchequer does constantly borrow money of them, and that so far from his complaining that they will not lend him money which it is desirable that he should borrow from them, it has, on the contrary, been an extreme convenience to the Chancellor of the Exchequer, as on many occasions he has been able to get over difficulties by borrowing from the National Debt Commissioners, when owing to particular complications, it might have been impossible to borrow from anyone else?—I am aware that that is the case in this country, but the whole constitution of this country is so different from that which exists in India, that I am unable to see how any advantage could be obtained by the introduction of that system there.

709. Even without establishing separate Debt Commissioners, would it not be possible to insist that the Government of India should enter in their own books a separate famine account, and that this should not be mixed up with other expenditure?—I think that it is very important indeed that a clear statement should be rendered of the expenditure of the Famine Fund.

710. Is

Sir *George Campbell*—continued.

710. Is it not the case that there is no separate account now of the expenditure of that Famine Insurance Fund, and that it is mixed up with the general revenue?—That is quite true.

711. And that that gives rise to the temptation, of which this year advantage has been taken, to spend it along with the general revenue?—It may be so.

712. I did not quite understand what you told the Committee as regards the plan for transferring productive works, which had proved not to be productive, to the category of ordinary works; in that case, is it proposed that the ordinary department of public works should repay the capital expended upon those public works?—If you undertake a work upon the ground that it is productive, it is included in the productive expenditure; and if, during its progress, it is found that the estimates are very much too low, that it will cost double or treble the amount estimated, and the Government then see that there is no reasonable ground for anticipating that it will be productive, the direction is that it should then be removed from the class of productive public works. Whether the works are to be stopped, or whether they are to be continued, rests solely with the Government in India, but there is no longer any ground for continuing to construct that work from borrowed money, and therefore it must be included in the ordinary expenditure under a distinct head.

713. Those orders have been actually issued, have they not?—Yes, they have; and the Government of India have recognised them.

714. Will not the effect of that order be as it were to enable the Extraordinary Department of the Public Works to get rid of all their bad bargains, so that when they make a statement showing the profit upon their works they will show only the profitable ones, and will pass the others on to some other account?—But you must show the expenditure somewhere; and I would ask whether it is not more desirable that it should be removed from the category of productive public works, and still proceeded with from the money raised year by year, than that it should remain and swell the amount which you would have to borrow.

715. That may doubtless be so; but we have already heard that when the Public Works Department submit a Statement showing a profit upon their so-called productive works, they have included on the one hand a considerable class of native works made before the Public Works Department expended any money on them at all; would it not have been but fair that on the other hand they should also show their failures, namely, the works which had eventually proved not to be profitable?—If the object were to show the Government how inaccurate the estimates had been, that would be the best plan; but if the object be, as I think is wisest, to prevent public works, which will not be remunerative, being constructed out of borrowed money, I think the existing rule is better.

716. But is it not very much a matter of account; is it not the object to show the public how far the so-called reproductive works have really been reproductive, and how far they have not?—I think the public will find it very difficult to ascertain that, because while the works are under construction, however clearly the

Sir *George Campbell*—continued.

Sir *T. L. Seccombe*, K.C.S.I., C.B. 20 March 1879.

accounts may be prepared, they will not give a distinct view as to whether the works pay or not.

717. I should just like to understand this. Under the existing orders when a work half constructed is found not to be profitable and is transferred to the ordinary department, where does the capital account of money already expended upon that work appear?—That capital would appear under the head of Productive Public Works.

718. It would remain so and the total would be shown?—Yes.

719. Then if a sufficient system of accounts were established, under which accumulated interest and everything else were shown, and it were clearly made apparent whether a work was really productive or not, do you think that you then might be able to enforce your rule upon the Government of India to a greater extent than you have hitherto succeeded in doing?—I think this new form of account, when fully rendered by the Government, will enable the Secretary of State to enforce his rule much more effectively than he has done.

720. Then I understand that the Home Government have distinctly, and so far as is at present known, finally negatived the system under which the Government of India proposed that a certain amount of dead weight should continue to be borne?—Yes, they have.

721. And as you have explained the matter, I understand your view to be this, that the dead-weight plan amounts very much to this, that the growing income of paying works, such as the guaranteed railways, may under that system be made away with on non-paying works in the future?—That is so.

722. And you think that is an undesirable system?—I do.

723. Has it occurred to you to account in any way for this tendency of the Government of India to be more extravagant than the Home Government; do you think that the atmosphere of popularity or unpopularity, under which Indian administrators live for a few years, is very apt to lead them away into extravagances for a time?—I should be more disposed to attribute the disposition of the Government of India to proceed rapidly with public works believed to be productive to the influence of the very able Public Works officers on that Government.

724. Do you think that this tendency of the Indian Government to exceed the control of the Home Government in this matter has been increasing of late years or not?—No; it existed, and it was urged equally strongly about the years 1868 and 1870, as it has been now; that is to say, the execution of large works and borrowing in this country, in order to enable them to carry out those works.

725. Do you think that as the Home Government is now constituted, and as the Government of India is now constituted, the control of financial matters is as effective as it was in the days of the East India Company?—I think it is more effective, because great works were often undertaken and completed before the Court of Directors knew much about them, communications with India not being so rapid or frequent.

726. I should like to ask your opinion upon a question I broached before the Committee last Session, and that is whether in regard to public works of almost every kind, you would approve

Sir *T. L. Seccombe*, K.C.S.I., C.B.

20 March 1879.

Sir *George Campbell*—continued.

of something in the nature of a sinking fund being established?—In a strictly financial point of view, a sinking fund is a mistake while you are still borrowing; but considering that it is likely that we shall be borrowers for many years to come, I think that borrowing in the shape of a long annuity, which is pretty nearly the same thing, would be a very wise course for the Indian Government to adopt.

727. Do not you think that as a mere matter of account, in order to enable us to judge whether our financial conduct with regard to Public Works is prudent or not, it would be right to debit all public works with something in addition to the mere interest, that is to say, with something in the nature of a deterioration fund?—There is no doubt much to be said for such a course, but until we have attained the greater object we have in view, at present, I think it would be unwise to introduce that system. My idea is, that in borrowing it would be wise to pay a little more in the shape of a long annuity than to pay the bare interest, because then the debt would expire after a certain number of years.

728. I want to put it in this way: if a man builds a house as a commercial speculation he is not satisfied if he should get as the interest of his money merely an equal amount of rent, he thinks he should get something more, as the house will wear out; now, upon that ground, in order to make the work safe, from a financial point of view, do you not think that the Government of India should get a little more out of the works than the mere interest for the money?—If they can get it no doubt they are right in doing so.

729. As regards borrowing in India, you have told the Committee that so much has been borrowed in India, and so much has been borrowed in England. Now was not the last year's loan, what I may call a sort of hybrid loan, which was neither distinctly borrowing in England nor in India, but which admitted of transfer from one to the other under certain circumstances?—Only as enfaced paper, not like the old transfer loans.

730. But was not there a loan in 1878-79 which the creditors could claim to have paid in gold?—No; an option was given of receiving in rupees in India interest which would vary according to the rate of exchange.

731. But they would be entitled to claim their interest in this country, would they not?—No, certainly not.

732. Do you think that when the Government of India go into the market in India to borrow they are restrained as regards the amount of borrowing solely by the interest of the Government, that there is not some pressure put upon them by the mercantile community, who say, If you borrow too much here you will disturb all our mercantile arrangements?—Probably some pressure is put upon them.

Sir *George Campbell*—continued.

Mr. *Ashbury*.

733. I think that, as a general principle, railways in India are being, or have been, constructed with the knowledge that they might not pay interest, but that indirectly the advantages justified the expenditure?—That has been the case, no doubt.

734. Is it your opinion that any sums might be expended on irrigation works, producing no interest, where there is a reasonable probability of an increase of revenue from additional land being brought under cultivation?—That, no doubt, might be a sufficient reason; but if additional land would be brought under cultivation through the agency of irrigation works, surely that income would be due to those works, and would justify their being constructed if the money derived from them was sufficient to pay the interest.

735. Generally speaking, what is the minimum rate of interest at which money could be raised in India for public works, either irrigation or railway?—It varies very much at different times; five years ago we could borrow at less than 4 per cent.; the interest was 4 per cent., but we obtained a premium, whereas now a 4½ per cent. loan might not obtain a premium.

736. How do you treat advances in your accounts which are made to corporate bodies when they are not repaid?—In the Finance and Revenue Accounts, every year there is a statement showing the balance outstanding against the different bodies at the beginning of the year, the amounts advanced and repaid during the year, and the balance outstanding at the end of the year.

737. Probably you will agree with me, that without a guarantee, the railway system as now existing in India would not have been in existence?—Certainly.

738. Without stating your political reasons, do not you think that exceptional circumstances might arise where a Government guarantee would be indispensable, where the railway itself would not commercially pay?—Such a case might no doubt arise; but provision should be made, I think, rather for the Government undertaking the work itself, than guaranteeing a certain amount of interest to a company.

739. You think that, in that case, rather than that the Government should give a guarantee to any railway company, who would construct the line, the Government should construct the line itself?—I think so.

Friday, 21st March 1879.

MEMBERS PRESENT:

Mr. Agnew.	Lord George Hamilton.
Mr. John Cross.	Mr. Sampson Lloyd.
Mr. Fawcett.	Mr. Onslow.

LORD GEORGE HAMILTON, IN THE CHAIR.

Sir THOMAS LAWRENCE SECCOMBE, K.C.S.I., C.B., called in; and further Examined.

Sir *T. L. Seccombe*, K.C.S.I., C.B.

21 March 1879.

Chairman.

740. CERTAIN Members of the Committee are anxious to have the cost of the total establishments connected with the Public Works Departments, whether those establishments are employed in carrying out public works ordinary, or public works extraordinary; could you furnish the Committee with such a statement?—Yes, we will have a statement prepared as completely as the means at our disposal will enable us to do; it may be necessary, in order to get a very useful statement, to ask the Government of India to send one home. It would be very desirable to have it, and then it would be open to anyone to apportion the expenditure on establishments and furlough allowances, according to the amount expended on the construction of the works.

741. I believe the member of the Viceroy's council in charge of the Public Works Department does annually make a statement as to the total sums he will require for carrying on both classes of works, both ordinary and extraordinary?—He does.

742. Then if we get the total cost of the establishment, including the central and supervising establishment, it would be easy to apportion the charges in connection with that department in proportion to the total disbursements of the department?—It would.

743. And to debit the expenditure in connection with public works extraordinary with a certain charge?—Would it be the desire of the Committee that the Public Works Secretariat should be included? You wish, I understand, really to gather together all the expenditure which can be said to be attributable to public works.

744. Without sending out to India, you could get from the Papers at the India Office, could you not, a sufficiently accurate statement?—It would not be a complete statement; but the preparation of it would show what more would be required, and it would be one great step towards getting what was really valuable. The statement would be very incomplete, as the information required would have to be sought in various ways, not merely from accounts, but from other sources as well.

Mr. *Cross.*

745. Would the return include superannuation allowances, pensions, and furlough allowances, and would any estimate be made which included them?—The furlough allowances could be included. I think, as regards pensions, it would be very dangerous to rely upon any estimate which could be made in this country. We have no sufficient data on which to form an estimate of how many years a civil engineer may be expected to serve in India. They are professional men, who may come home and resume their profession in this country. We have had so little experience of how long, for instance, those engineers who are going out from Cooper's Hill will remain in the service, that it would be exceedingly difficult, and I doubt if it would be wise, to attempt to give an estimate here of what would be the probable cost of their superannuation allowances.

746. Then you could not give any estimate of the time when the superannuation allowances would be increased or decreased?—No; in preparing any estimate, it would have to be assumed that the existing rules will be continued.

747. Can you give the Committee any information with reference to the cost of the public buildings connected with the engineering works in India; for instance, the cost of the public buildings which contain the staff?—No; that must come from the Public Works Department.

Mr. *Sampson Lloyd.*

748. Upon the point of furlough allowances; I wish to ask you what they consist of; do they include any allowance for travelling expenses, or are the furlough allowances merely a payment during absence from duty?—The furlough allowance is a certain portion of the salary only which an officer draws, not including travelling expenses.

749. I presume that furlough allowances are granted to Europeans only; are they granted to natives too?—We rarely have natives coming to this country on furlough. A certain class of native servants might claim the privilege if they wished, but they do not.

750. Does not that go to show that the em-

Sir *T. L. Seccombe*, K.C.S.I., C.B.

21 March 1879.

Mr. *Sampson Lloyd*—continued.

ployment of natives, where suitable, would affect an economy in the point of furlough allowances as compared with the employment of Europeans?—Certainly.

751. Upon the subject of Public Works, may I ask do you know whether any portion of the expenses upon any particular public work is contributed from the funds of local governments, municipalities, or other local bodies?—No portion of those which are the subject of the present inquiry, that is works constructed from money borrowed by the Government of India.

752. I take it that your answer is conclusive upon that point, that nothing comes from those sources?—I was under the impression yesterday that very small sums had been obtained from natives in India for public works, and that Sir George Campbell, while he was Lieutenant Governor of Bengal, had obtained some small sum on that account, and that it was well expended. He said it was not so; and he went further, and said that upon that which I had certainly considered a desirable mode of obtaining funds for constructing works, nothing worth mentioning had been received.

753. Then upon another subject I would like to ask you one question; you were good enough to state, in your evidence yesterday, that 27 millions and some odd thousand pounds had been added to the public debt of India in the last six years; can you tell the Committee how much of that addition may fairly be attributable to the loss on exchange during the last six years?—I could give from the accounts the loss by exchange on the one side; but in order to give an accurate view it would be necessary to show how much was to be credited on the other side, because there is a gain as well as a loss by exchange. I will put in a statement showing the nett loss by exchange during the last six years.

754. Are not the accounts as they come from India all presented in rupees?—No, they come home in pounds sterling.

755. Then as the expenditure, or a great deal of it, is conducted in rupees in India, I presume they are converted into pounds sterling in India at the rate of 10 rupees to the pound?—They are.

756. Is not that very misleading to the English public as regards the true cost?—No doubt it may be so; when the exchange varies so much as it does at present, it necessitates that inconvenient item of "loss by exchange"; but, on the other hand, the system has great advantages, because comparison is easy under such a mode of treating the rupees. If the accounts were rendered at rates of exchange varying in different years, it would render any comparison exceedingly difficult. Up to the year 1856-57 inclusive the accounts were presented at 1 *s.* 10½ *d.* the rupee. In 1857–58 a change was made to 2 *s.*

757. Considering that the rate of exchange varies in that way, would it or not be better that the accounts should be published in rupees and not in sterling, when the comparison would of course be easy?—There would be no difficulty in publishing an abstract statement of transactions in India in rupees as well as in pounds sterling.

Mr. *Onslow*.

758. You are aware that in very high quarters it is stated that the sum expended by the old East India Company on public works is very small indeed?—It was comparatively small.

759. Can you furnish the Committee with a statement showing how much was spent by the East India Company before the annexation of India to the Crown, say for 25 years before the year 1858, on irrigation works, and how much on other kinds of public works?—I am afraid we could not obtain that information in this country; it could be furnished in India.

760. Are you aware whether there was any considerable sum spent by the old East India Company on what we should now call public works extraordinary, that is to say, works for the prevention of famine and for irrigation?—Irrigation works were constructed by the East India Company from an early period; in fact it is difficult to say when small works were first executed, but the Ganges Canal was a very large work which was undertaken at an early period by the East India Company; and in the year 1854 they gave instructions to the Government of India to proceed with irrigation works to the extent of a million a year in addition to that which they had previously been expending.

761. Was the primary object of the construction of the Ganges Canal for transit purposes or for irrigation purposes?—It was for both, I believe.

762. Therefore, previously to the year 1858 the old East India Company had done as much as they could, considering their revenue, towards irrigation works and the prevention of famine?—They had.

763. And had given instruction for the further prosecution of works under that head?—They had.

764. When the Government of India sanction a work, and send it home for the approval of the Secretary of State, they invariably use the word "remunerative"; am I to understand by that that they specify to the Secretary of State how much per cent. they expect the work to pay, and in what other way it will be remunerative, or do they use the word "remunerative" in a broad sense without informing the Secretaty of State how much they expect to realise by the work when completed?—When a work is submitted for the approval of the Secretary of State with detailed plans and estimates it is submitted in the Public Works Department, and is there considered; it does not come before the Financial Department. The form in which works are submitted for approval may vary, but there must be a description of the work, with a statement as to the probable cost, and what return may be anticipated from it.

765. Then I may presume that they use the word "remunerative" in a broad and general sense?—In a broad sense, and I assume that it can only well be termed remunerative so as to be placed under the category of Productive Public Works, if it fulfils the conditions which the Secretary of State has laid down; that is to say, that it shall yield interest upon the capital outlay on the work, including interest during the period of construction.

766. Do the India Office always satisfy themselves that such will be the case before the work is sanctioned?—Certainly; not through my agency, but undoubtedly that is done.

767. I presume that you, from your great experience

Mr. *Onslow*—continued.

rience of the finances of India, approve of the plan of keeping an annual reserve for famine purposes?—I do.

768. That may be all very well in theory, but do you think that the Government of India will ever seriously be able to accomplish that purpose?—Not unless they observe the very rigid rules which we have prescribed. I think that when the Government of India obtained by new taxation 1,500,000 *l.* with a view to provide for future famines, it became incumbent on them to apply a portion of that 1,500,000 *l.* towards repaying the debt which the Secretary of State had incurred for famine; and then when a famine again occurs he will be in a position to expend afresh.

769. Let me put a case in point, namely, the 1,500,000 *l.* which you mentioned, one-half of that, or 750,000 *l.*, is to be sent home to the Secretary of State in payment of the expenditure on by-gone famines; that is really what it amounts to, is it not?—On recent famines; in fact expenditure is being incurred on account of famine in the present year.

770. But still I may say for by-gone famines?—Not antecedent to the very recent famines, which led to the taxation being imposed.

771. That leaves 750,000 *l.* for the Government of India to expend, and to keep as a reserve for famine purposes?—Yes.

772. Now supposing there were a war on the frontier, the same as we may always expect in India, such as the Bhootan or the Umballa expedition, how would that expenditure be met out of the charges of the year, would you propose to touch the 750,000 *l.*; again, you are aware that in 1864 there was a very serious devastating cyclone in India, which cost the Government about a million of money in the repair of public buildings; if India were ever visited by such a calamity again, would you propose that any portion of this 750,000 *l.* should be expended either for this little war, or for making good the effects of the devastating cyclone?—In the event of war, or any emergency other than famine, calling for expenditure, if it cannot be provided for out of the income of the year, which is improbable, any Government would be compelled to borrow money to meet the cost.

773. Therefore, though you may be able to realise the 750,000 *l.* surplus, you would propose that that should not be touched, notwithstanding anything else which might happen which would create a deficit?—As regards the 750,000 *l.* which is to be sent home, I think it should absolutely be applied towards building up a famine fund here, by repaying what we advanced them, in order that it may be again available for the purpose for which it was raised.

774. Though you might have this surplus in India of 750,000 *l.*, besides the 750,000 *l.* which are sent home from India to the Secretary of State, you would propose to borrow money in case a great calamity were to reduce your surplus into a deficit, notwithstanding that you were able to send that 750,000 *l.* home and keep a similar amount in India as well?—If it were not required for preventive works it would remain in the cash balances of India, and would be available for any purpose.

775. Therefore the idea of the Government of India would not be carried out, because this 750,000 *l.* need not be spent for famine purposes;

Mr. *Onslow*—continued.

Sir *T. L. Seccombe*, K.C.S.I., C.B.

21 March 1879.

it might be spent upon a war?—But we calculate that 750,000 *l.* is within the amount which they would expend annually on famine works; and I apprehend that such works once commenced would hardly be put aside in the event of a war, if they were really useful and important works.

776. Therefore, in case of emergency, your idea would be that the Government of India should borrow money?—Certainly, unless their cash balances should have accumulated by surpluses so as to bear the expenditure.

777. What I want to ask you is this: this is the revenue for famine purposes; if this money is to go into the cash balances, and the Government does not require it for famine purposes, would it not be rather an odd thing that the Government should not take it out of the cash balances and put it into the war?—No doubt there is force in that observation, but if the 750,000 *l.* is not required in India for productive works it should be sent home to reduce the debt in this country, which has been incurred for famine purposes.

778. Has that view of yours ever been put before the Government of India?—Not definitely. It was by a sort of compromise that 750,000 *l.* was to be remitted to England. We in England, having used the power of borrowing given us by Parliament to meet the famine, were very desirous to replace ourselves in a position to borrow afresh, if it should be required, and we could not do that except by obtaining from India the repayment of the sums which we had advanced. On the other hand, in India, they were desirous of expending it either on protective works, or of applying the amount in reduction of that which they would borrow there for productive public works. Now the paying off or keeping down the debt in India is a very different thing from enabling us to pay off a debt which we have incurred here.

779. Now, if the cash balance were what I may call flush with this money, and some calamity happened in India, either a little war, or, as I said before, a cyclone, would it not seem odd that you were obliged to borrow money to pay for these calamities when your cash balances were overflowing?—If the cash balances in India were unnecessarily large, it would be unwise to borrow, but the position of the Secretary of State is that the first charge on the famine fund is the re-payment of the sum which has been raised here.

780. In the cases which I have stated, the money which you may send home out of this cash balance would be purely optional, and therefore the cash balances would lie at the mercy of any Finance Minister, who would say, I will not send home this amount; I want a certain amount to pay for this little war; it would be a singular state of finance, would it not, if the Finance Minister were to say: I cannot send home the entire half, but will keep 350,000 *l.* to pay for a little war?—It would not be dependent on the Finance Minister, but on the Government of India. It would be contrary to the obligation imposed on them, and the Secretary of State would, no doubt, require that his orders should be observed.

781. You think that the Secretary of State would say, Notwithstanding anything that has happened, your cash balances are in default of sending home 550,000 *l.*, notwithstanding that

Sir *T. L. Seccombe*, K.C.S.I., C.B.

21 March 1879.

Mr. *Onslow*—continued.

you have sent home 200,000 *l.*; instead of paying for your war out of that money you must borrow for the purpose?—I think the Secretary of State would say so.

782. Has it ever been put in that strong way that the Government of India expect it?—We have very plainly stated that the repayment of money borrowed here is a first charge on the famine fund, and that they must be prepared to remit three-quarters of a million annually.

783. And that they must not expect to draw upon it for any accident which might happen in India?—We have not said that in so many words, we considered that that was implied in the requirement that it should be sent home.

784. But still that is the effect of your answer this morning?—Our expectation is that they will abide by the instructions given.

785. Advances to municipalities for irrigation purposes would come, would they not, out of this reserve fund?—No, the advances to municipalities have nothing to do with the famine insurance fund.

786. The Government of India would spend that money?—Out of the money which the Government of India raise they make advances to municipalities; I should be inclined to think that those advances have nearly reached their maximum.

787. What is really the practical financial control which the Government of India have over the different municipalities, and over the different local governments, as regards the money which those have borrowed?—Every advance of money to a municipality must be approved by the local government. A proposition is then made by the local government, and the sanction of the Government of India is necessary.

788. And they accept the estimates of the different local governments, do they not?—I conclude they do, but you are aware that interest is charged on the advances, and that has to be provided by the municipalities, and there is a sinking fund also required to pay the principal.

789. Up to what sum do the Government of India allow the local governments the undertaking of any particular project?—I am not aware.

790. Let us take it that a local government wanted to prosecute a work estimated to cost 200,000 *l.*?—If a municipality satisfies the local government that it would be desirable to execute a work costing 200,000 *l.*, that proposition would go to the Government of India, and it would rest with them to sanction or refuse the advance.

791. You said there was no scheme at present laid down to induce natives to lend from their hoards; I do not wish to go into the question whether the natives have hoards or not; but how is it possible to lay down any scheme unless the people came forward voluntarily?—It is exceedingly difficult; and so difficult that no one as yet has devised a plan which has been found practicable.

791*. Would any plan be found practicable, unless the natives came forward voluntarily?—No doubt the action must be voluntary on the part of the natives, but in former days, when we had an open loan, the natives did not subscribe much more than they have done of late years.

792. Sir George Campbell's questions were put to you to ascertain whether it would not be possible to induce the middle class, or lower orders amongst the natives, to subscribe much as they do in France; do you think any scheme could be laid down which would be likely to have that effect?—I am not prepared to say that any effectual scheme could be laid down. The subject has often been considered, but no one has yet been able to devise a satisfactory plan; some persons have advocated giving a larger amount of interest for small sums to natives than the ordinary rate, but then would come the difficulty, how are you to prevent other persons, through the agency of natives, lending money to the Government, and reaping a benefit which was not intended for them.

793. You expressed, I think, the opinion yesterday that the Government of India were less economically disposed than the Home Government; in what respect?—I think I only admitted that the Government of India were disposed to be less restrictive in regard to productive works than the Home Government.

794. Is it not the case that a great number of those public works which have been prosecuted in India have originated with the Home Government?—I am unable to answer that question; it would be necessary to examine the Public Works Secretary on that point.

795. I presume you are not aware whether the initiative, as regards the new barracks, took place in India, or in England?—I believe that a considerable impulse was given from this country towards the construction of barracks, but not officially, and in no way have I ever seen anything more than a desire expressed by Sir Charles Wood, to provide, as soon as practicable, barracks for European troops, but he at the same time distinctly stated that it was not to be done with borrowed money.

796. You expressed an opinion that the Public Works Establishment in India should be reduced?—I did.

797. Have you formed any definite opinion how that could be done without at the same time reducing the establishments in England?—No doubt, if you reduce the number of engineers which are annually to be supplied to India, the question would arise whether the establishment of Cooper's Hill College could be reduced; any reduction of the Public Works Department must be effected upon some equitable principle similar to that which has governed the reduction of Government departments in other branches.

798. I suppose there would be some sort of bonus given as an inducement to retire?—Yes, something of that sort; it is obvious that if you are to construct works only to the extent of 2,500,000 *l.* a year, you ought not to have establishments suitable for a larger expenditure.

799. And, therefore, I presume you would think that if the establishments in India were to be materially reduced, as they ought to be now, we should no longer require such a large establishment at Cooper's Hill for the training of young engineers?—It would seem to follow.

Mr. *Fawcett.*

800. I gather from your first day's evidence that the Secretaries of State for India in Council have all along in a succession of years consistently advocated a policy of care and caution with

Mr. *Fawcett*—continued.

with regard to the construction of public works?—They have.

801. It has occasionally happened that the importance of those principles has been recognised by the Government of India; but it has seldom or never happened that the principles have been carried out?—Not fully carried out.

802. The supreme power, especially in finance, is vested in the Secretary of State in Council; he wishes a certain policy to be carried out, and he cannot get that policy carried out; to what circumstance do you attribute that want of control?—The Viceroy of India is a very high officer of State; the Government of India comprises within it men of high standing and great ability; their officers in the several departments are generally exceedingly able men, and the responsibility on that Government is very large. I often see it stated in our newspapers that "India must be governed in India." If it be the fact that the Government of India has so great a responsibility, and the people of England think they should not be interfered with unduly, it appears to be but natural that the Government of India should consider that in regard to many matters of great importance, they ought not to be controlled too much by the Home Government.

803. I agree with you at once, that saying that India should be governed in India is a different thing entirely from maintaining a system which nominally allows India to be governed in England, and yet actually allows it to be governed in India, because those in India can shift the responsibility upon the Secretary of State?—I think it would have been well if successive Secretaries of State had exercised a greater control over the expenditure on public works, but I know that is an opinion which is not shared by a very large number of exceedingly well-informed people connected with India.

804. What I understand is, that wherever a power is nominally centred, it should really be exercised so that you should concentrate the responsibility?—I think the Secretary of State cannot divest himself of the responsibility which Parliament has imposed on him, and, therefore, he should take care that his directions are observed.

805. I dare say you have known instances in which the Secretary of State having been anxious to carry out this policy of care and caution in public works, has been overruled by public opinion in England?—I think public opinion in England has exercised at times an injurious influence on public authorities.

806. Up to quite the last few years the influence of public opinion in England has been, has it not, to press the Secretary of State to spend more money upon public works than he might otherwise have done?—It has, decidedly.

807. And the Secretary of State, being a member of a political Government, was naturally almost necessarily influenced by this public opinion?—I think that, to a certain extent, is inevitable.

808. Have you not noticed a great change in public opinion within the last few years; that where formerly you might have said that there was a general belief amongst the English public that scarcely too much money could be spent upon public works, people now begin to feel that great care is required in that expenditure?—Yes, that is so.

Mr. *Fawcett*—continued.

Sir *T. L. Seccombe*, K.C.S.I., C.B.

21 March 1879.

809. With regard to a scheme which was presented to you by Mr. Childers, that the Government should give, not what we may describe as a full guarantee upon railways and other private works to public companies (meaning by full guarantee a rate of interest which represented the market rate of interest), but something less; that is to say, that if the rate of interest in the market were 6 per cent. they should give a guarantee to the amount of 3 per cent., does not this strike you as an objection to the scheme, that as it is not possible to tell beforehand whether or not a work will repay the interest upon the outlay, it may still involve the Government in a very serious loss if this limited guarantee be given?—Certainly.

810. If it is said that there are works certain to prove remunerative, and if companies will not carry out those works without a full or limited guarantee, does not the fact that they will not carry them out without this guarantee, throw, at any rate, a certain amount of doubt upon their own absolute confidence in the remunerativeness of those works?—It does.

811. Would it not have been wise of the Secretary of State, if any company pressed him to give a limited guarantee, saying to him, We feel perfectly certain that this work will prove remunerative, and you are running no risk, for him to reply: Well, if you feel so confident that the Government will run no risk you cannot mind running the risk yourself?—Of course any proposition submitted to the Secretary of State would be very fully considered on its merits; and I conclude that any such proposition would be referred to the Government of India for their opinion and that of their officers, and the local knowledge which they possess would enable them to form a better opinion, and to report as to the probable result of the construction of such a work.

812. But does not all experience show that the most experienced persons connected with India cannot really form a trustworthy opinion before a work is undertaken, whether that work will prove remunerative or not?—It has been so in the past, but with the warnings which they have now had, with the responsibility which rests upon them, and with the much stricter inquiry which is now made in regard to any propositions, I should not be myself disposed to think that we must assume that if a favourable estimate be formed in regard to any work, it may not be a sound one.

813. But up to the present time, I do not know what it may be in the future, all experience shows that it is almost impossible to tell beforehand whether a work will pay or not. Many of these works, about which the most confident predictions were made as to their remunerative character, have turned out to be unremunerative in the sense of making any return?—Undoubtedly that is so.

814. And, therefore, considering the financial condition of India, at any rate, it would be prudent to proceed with great caution, and not to assume that it is possible to predict beforehand whether a work will turn out to be remunerative or not, until experience shows that what has happened in the past is not so likely to happen again in the future?—Certainly, and I think

Sir *T. L. Seccombe*, K.C.S.I., C.B.

21 March 1879.

Mr. *Fawcett*—continued.

that if any scheme of that nature were entertained, it would be a very important element in the arrangement that the interest guaranteed should be paid in India.

815. And paid in silver?—Yes, paid in rupees.

816. That is to say, paid in the same coin which the Company receive as receipts?—Certainly.

817. I understand you to hold a very decided opinion as to the extreme impolicy of constructing public works out of money borrowed in England?—I do.

818. You recognise fully the great danger of a country which receives its revenue in one metal increasing the obligations which it has to meet in another metal?—I do.

819. I understand, then, that you consider, that on the average of years, not more than 2,000,000 *l.* or 2,500,000 *l.* could be raised in India; that you could not calculate on more than that?—I would not like to go so far as to say that upon an average of years, something above 2,500,000 *l.* might not be raised in India for all purposes, but I think it is most essential to lay down the limit of from 2,000,000 *l.* to 2,500,000 *l.* as that which shall be borrowed for productive public works.

820. Then the amount which has been borrowed during the last few years for productive public works considerably exceeds (is almost double) that which you think ought to be borrowed?—The amount which has been expended on productive public works in the last six years has been 25,000,000 *l.*

821. That is an average of over 4,000,000 *l.* a year?—Yes, it is an average of over 4,000,000 *l.* a year, and in India, during the same time, the net amount which they have borrowed has been under 11,000,000 *l.*, that is less than 2,000,000 *l.* a year.

822. So that the public works policy has, according to your opinion, gone wrong in two directions; in the first place, during the last six years, about twice as much has been borrowed as ought to have been borrowed, and nearly half of the whole amount which has been borrowed has been in England, whereas you think, considering the present system of Indian finance, that nothing ought to be borrowed in England for public works?—Quite so.

823. I understand that the whole of your evidence goes in this direction, that the public works policy, after all, depends mainly upon financial considerations?—I think so, certainly.

824. And that a public work which might be extremely useful, although it may not prove to be remunerative in the sense of returning the current rate of interest upon the capital expended, may be a very desirable work to be carried out, if it could be carried out from the surplus revenue, but that it might be most inexpedient to carry it out, if it could only be carried out by increasing the debt of India?—That is quite my view, and more especially if there be any increase of the debt in England.

825. That being the case, and considering that the financial position of India has been described by the present Finance Minister in these words, "The ordinary revenue is barely sufficient to meet the ordinary expenditure," and that there is no reserve for contingencies, such as war (a reserve is now being provided for famine), does not it appear to you that constructing public works out of borrowed money, will gradually and steadily add to the debt of India; even to the limit of the extent which you would recommend?—Yes, there is certainly a danger that it may add to the annual charge.

826. Do you think that that is a correct description (and I have not seen it disputed) of the financial condition of India; and do you think it is prudent, even to the limited extent you have advocated, to increase the debt of India for the construction of public works?—I think you must take into consideration whether it is likely that indirect benefits sufficient to compensate for that small addition to the debt of India may not be anticipated.

827. But then, if what has happened in the past should occur in the future, and these public works should not pay the interest upon the capital expended, this increased borrowing must necessitate increased taxation, and where is that increased taxation to come from?—An increase of taxation would only be necessary if the indirect benefits added to the direct benefits should be less than the amount of interest incurred for the capital employed in construction.

828. You mean the indirect benefits to the revenue?—Yes.

829. But now, including the indirect and the direct benefits to the revenue, many of the public works which have been constructed (without for a moment disputing their usefulness) have not paid?—Certainly; I am only speaking of what, under more careful supervision and greater care in undertaking them, might be anticipated in the future if the annual expenditure were only from 2,000,000 *l.* to 2,500,000 *l.*

830. Then I understand you to admit that even expending the limited sum which you recommend, which I take to be about 2,000,000 *l.* a year, and upon the strict condition that it should be all raised in India, there is even with that limitation a certain risk in the present financial condition of India?—There is certainly a risk that you may not obtain directly the full amount of interest for it; how far undertaking such works might prevent famine, or, if famine occurs, to what extent the works constructed might facilitate famine, relief I am unable to say; but I should think it probable that the direct receipts from the works and the indirect benefits might reasonably be expected to be equivalent to the interest upon the capital spent in their construction.

831. You would admit, would you not, indeed I think you have already admitted it, that there are many public works in India which it would be extremely desirable to carry out if India had a surplus revenue?—Certainly.

832. That being the case, would it not be possible to confer upon her the advantage of constructing those public works out of the surplus revenue by reducing the expenditure?—It might be.

833. Could you indicate (because it occurs to me to be most intimately connected with the question to what extent public works could be carried out) your opinion whether the expenditure could be reduced?—With regard to Public Works Expenditure, that could be reduced; there is a difficulty, no doubt, in reducing the

Mr. *Fawcett*—continued.

he general expenditure in India, but I think it is worthy of consideration whether the military expenditure might not be reduced.

834. Having indicated your opinion that it was worthy of consideration whether the military expenditure is capable of reduction, is there any other branch of expenditure in the administration of India which you think is capable of reduction?—The military expenditure is that which I think it right to mention in evidence upon such an occasion as this; I am not able to indicate any other branch, as I have not prepared myself for any inquiry on the subject.

835. Then in confining your remarks to the military expenditure, do you do that because of the large proportion of the revenue of India which is absorbed in the military expenditure, or because you have specially devoted your attention to that branch of expenditure?—In regard to the Home Military Charges, I have been often engaged in inquiries with regard to the possibility of reducing them. Papers on the subject have been laid before the Houses of Parliament, and having been a member of several Committees on the military expenditure, I am of opinion that it is desirable to consider whether it might not be reduced.

836. Then you have devoted special attention to this subject?—Yes, more especially to the Home Army Charges.

837. Has the result of your deliberations been published anywhere?—The Reports of the Committee on the Home Army Charges, of which I was a member, were laid before the House of Commons, and printed as a Return, and formed the subject of inquiry before a Select Committee of the House of Commons in the year 1874.

838. I may presume that your opinions, without asking what they are as to the reduction of military expenditure, are the same now as were expressed before that Committee?—In regard to the charges which were then in question, certainly.

839. Do you think that the Establishment Charges with regard to public works are capable of great reduction?—I am unable to give an opinion upon that point.

840. But it is obvious that if, as you recommend, only 2,000,000 *l.* are spent instead of 4,000,000 *l.*, as have been spent, it would be necessary to reduce the establishment charges?—Certainly, the establishment charges should be reduced in proportion to the expenditure to be incurred.

841. With regard to the Famine Fund, if 750,000 *l.* a year is transmitted from this fund to England to reduce the debt, of course there would be no advantage in doing that, if at the same time money is being borrowed in England; it would simply involve the fallacy of the old sinking fund, and you would be putting money into the one pocket which you were taking out of the other?—Certainly; the object of sending that money to England would be to repay to the Home Treasury the advances which had been made from it, and so to render it unnecessary to apply to Parliament to obtain further power to borrow here. If our circumstances required that we should borrow again in this country there would, under existing circumstances, be no option but that of asking Parliament to allow us to borrow.

Mr. *Fawcett*—continued.

842. In your statement of the amount of money which has been raised by loans in England and India during the last six years, have you included what may be described as the Floating and Unfunded Debt?—Yes.

843. In addition to the permanent debt the Indian Government have obtained temporary loans, have they not?—Yes, but only for short periods.

844. But during the present year a not inconsiderable sum has been advanced to them by the Bank of England, has it not?—Yes, at one time we owed the Bank 1,500,000 *l.*; at present we have about 1,000,000 *l.* outstanding.

845. And that million is included in the figure you have given?—That 1,000,000 *l.* is included.

846. Is there not a statement made to the effect that the Indian Government have used the capital of certain funds, such as the Civil Service Pension Fund?—The capital of the military funds was accumulated to meet the pensions of widows and orphans. When the Government took over the military funds they were in a very unsatisfactory condition, although they had a large amount of capital. The Mutiny had greatly increased the charges upon them, and the Government undertook to relieve the funds of those pensions which resulted from the losses consequent upon the Mutiny. We then held about 3,500,000 *l.* of capital on account of these funds, and when their assets and liabilities were made over to the Government we had to determine what we should do with the capital, whether we should write it off in one year as an extraordinary receipt, or apply it as long as it might last in aid of subscriptions on account of the funds in order to meet the pensions; and after much consideration the latter was considered the best plan of dealing with it. Therefore, year by year, a certain sum has been taken from the capital to make up the difference between the subscriptions and the amount of the pensions.

Mr. *Sampson Lloyd.*

847. May I ask what the subscriptions are?—The subscriptions are payments by the officers to provide pensions for their widows and orphans.

Mr. *Fawcett.*

848. But you have adopted a different plan with regard to the civil funds, have you not?—Yes, we have adopted a different plan with regard to the civil funds, because when we took over the military funds we closed them to any fresh entries, and thought it better to institute another fund which should be entirely self-supporting for military officers; and therefore we applied the capital towards paying pensions which would be gradually reduced until they expired. In regard to the civil funds, when we took over the capital it was only at the close of certain measures which greatly increased the annuities to civil servants, and that being an increasing instead of a decreasing charge, it was thought that it would be unwise to treat the capital in the same way as we had treated the capital of the military funds; and it was written off at once as an extraordinary receipt of the year, but not brought into account as revenue, or as showing any surplus.

849. Then really that capital, looking upon it as a financial transaction, has been used?—The

Sir *T. L. Seccombe*, K.C.S.I., C.B.

21 March 1879.

Mr. *Fawcett*—continued.

capital of the civil funds being so treated, the debt was reduced to a corresponding extent.

850. Then, really, that ought practically to have been added to the amount; you have used that fund, and therefore it ought to be added to the common revenue?—We did not use the money. It was simply that the deposits were reduced by a corresponding amount. There are transactions every year, on account of deposits of different institutions, of which we render an account to Parliament, but they do not enter into any revenue or charge account. It is merely that as bankers to certain institutions we hold less money in our hands.

851. To show the actual returns of public works you really want two returns: the first to show how much borrowed money has been spent upon the construction of public works, and then, in order to exhibit it as a commercial transaction, to allow for the compound interest during the construction, or during the period in which the works have not paid?—Certainly.

852. That last return would represent the commercial results?—It would.

853. Such a return as that has not yet been made up?—No, we are not in a position to do that at present, because we have not the information.

854. All your borrowing power in England now has been exhausted, has it not?—Very nearly.

855. And, besides that, you have incurred a liability to the Bank of 1,000,000*l.*?—That is within our borrowing powers. We have not exceeded them, if that 1,000,000*l.* be included.

856. But then you had exceeded it when you borrowed one and a half millions from the Bank?—No, we had then the power, and, when we paid off the 500,000*l.*, power to borrow to that extent reverted to us, and we have availed ourselves of it for part of the amount.

857. But now your position is such that if you require to borrow more money in India you must come to Parliament?—We must come to Parliament for power to borrow in England.

858. I understand that you advocate very strongly the policy of borrowing money in India instead of in England, both on financial and political grounds?—I do.

859. The financial grounds being in order to avoid the risk that must be run of receiving your revenue in one coin and having to make your payments in another; and the political grounds being the desirability of giving the natives a greater stake in the country?—Yes, thereby giving the natives a greater stake in the country, and putting an end to the very mistaken idea that a tribute of 15,000,000*l.* or 16,000,000*l.* is paid annually by the people of India to this country, which is, in my opinion, a misapplication of terms.

860. But you recognise the importance of diminishing, as far as possible, the amount which India has to transmit to England; you consider that this loss by exchange has arisen partly from these large remittances?—I do; and I consider that every million added to the remittance above a certain sum has an effect upon the exchanges beyond the mere proportion which you add to the amount.

861. Will you explain to the Committee what you mean by that?—I think you may remit, say 10,000,000*l.*, for example, perhaps at a tolerably good rate of exchange; if you add 3,000,000*l.* to that, you get a rate of exchange more unfavourable, and if you add another 3,000,000*l.*, the exchange is more unfavourable still. I think that the demand for bills on India will bear a certain amount being annually placed on the market by the Secretary of State, but if you go beyond that amount the rate obtained for the whole remittance is reduced in a greater ratio than the addition represents.

Mr. *Fawcett*—continued.

862. Then you consider that that occurs with regard to bills which has been again and again observed as occurring with regard to commodities; you increase the supply, and up to a certain point an increased supply only produces a certain limited effect in depreciating the value or the price, but when you make a certain increase beyond that you soon get to a point when no more of the article can be taken, and then you produce a much greater depreciation in prices?—That is quite what I mean.

863. Therefore you think that the amount of bills which have to be sold has arrived at that point at which the adding of 1-15th to the amount of bills which have to be sold, would lower the prices disproportionately over the whole 15,000,000*l.*?—I do think so.

Chairman.

864. There are some answers which you gave to questions put by Mr. Fawcett which I think, unintentionally, conveyed an impression which might seem something like a reflection on the Indian Government; Mr. Fawcett asked if it were not the case that the Secretary of State had laid down a certain policy which he had been unable to get the Indian Government to carry out; would it not be rather more accurate to say that he had laid down certain principles to comply with which it was necessary for works to be constructed by loan to be sanctioned, it was principles not policy which he laid down?—I referred especially to the necessity for compliance with the instructions of the Secretary of State relative to borrowing in this country.

865. But as regards the question of complying with the conditions laid down by successive Secretaries of State as to public works extraordinary, the Indian Government accepted those principles, and if they failed, they failed from the great difficulty of putting them into practice?—I would by no means wish to convey to the Committee that the Government of India were, in my opinion, in any way open to reflection in regard to this matter; no doubt they are as zealous as we in England can be, to do what is best for the public interests, but they have taken a different view. They, entertaining a belief in the soundness of a forecast system, would proceed with the construction of productive works by means of borrowed money more rapidly than the Secretary of State would desire, but they do not consistently entertain that view, as I showed the Committee yesterday by an extract from one of their Despatches. They recognised in that Despatch the necessity of adopting the course which the Secretary of State had prescribed; but at another time, no doubt under the pressure of other circumstances, they advocate the adoption of the principle of the forecast system, and ask that they should be allowed to proceed with productive works so long as the works do not involve a greater annual cost than at present.

866. Some

Sir *T. L. Seccombe*, K.C.S.I., C.B.

21 March 1879.

Chairman—continued.

866. Some years ago there was, I think, a much more sanguine view of the returns likely to be obtained from irrigation works than is at present held?—There was.

867. Could you furnish the Committee with a Return which was presented to Parliament some 10 or 12 years ago, giving as a per-centage the probable result of the expenditure upon irrigation works in different parts of India?—I will furnish that Return.

868. One part of our inquiry has not been brought before you with a view of eliciting your opinion, and that is as to how famines are in future to be prevented; we have had certain gentlemen before us who have expressed a strong opinion that the only way to prevent famine was to incur an almost unlimited expenditure in the making of irrigation works; which would you prefer to do: to carry on the prosecution of public works within the limits already prescribed by you, and, when a famine occurs, endeavour to meet it out of the general resources of the Government of India, or would you attempt to forestall famine by creating all over India irrigation works, with a view to giving the whole population immunity from drought?—I think that the latter plan would be a continuation of the system which has been found to work unfavourably. I think the wiser system would be to construct such productive public works as can be made in India by the expenditure of 2,000,000 *l.*, or 2,500,000 *l.*, a year, and for the Government of India to employ 750,000 *l.* of the Famine Insurance Fund, in the construction of works tending to the mitigation or prevention of famine.

869. Then you would prefer to husband your resources and carry on the public works to a certain degree; and then when famine breaks out, endeavour to meet it out of the general revenues of the Government of India?—Yes, rather than undertake a variety of expensive works which would certainly cost a very large sum of money, and which might in the end prove not to be effectual for the object in view.

870. That is to say, works the cost of which was certain, and the return from which would be uncertain?—Certainly.

871. Is there not one peculiar danger to which Indian finance is liable, namely, that when a famine breaks out, which has to be met by a great expenditure, there is pressure brought by public opinion to embark immediately upon a wholesale scheme for the prosecution of irrigation works?—There is; on the occurrence of the famine in 1873-74 it was stated in some of

Chairman—continued.

the public newspapers that the Viceroy would be held responsible for the death of every native which followed as a consequence of the famine. There can be no doubt that such an expression was mischievous.

Mr. *Cross.*

872. I think you said that an excessively large issue of Council drafts caused a considerable fall in the exchange?—It causes a fall in the exchange. The fall in recent years is, I believe, attributable to several causes; and one cause is the increase of the amount of Council drafts.

873. Which has also, you would say, contributed to the fall in the price of silver?—No doubt they act and re-act on each other.

874. The Indian Government being the largest bullion dealers in the world at present?—They are, practically, very large dealers.

Mr. *Onslow.*

875. Could you tell the Committee how much is the estimated loss by exchange, if the price of silver falls 1 *d.* per ounce; that is to say, for every 1 *d.* how much does the Government of India lose?—There are 444 grains of fine silver in an ounce of standard silver, and 165 grains of fine silver in a rupee, therefore when a fall of 1 *d.* an ounce occurs in standard silver, the value of the fine silver in a rupee is reduced to the extent of about one-third of a 1 *d.*, being ·3716 of a 1 *d.*

Mr. *Fawcett.*

876. Of course, what would make a more favourable exchange for India, and what would tend to raise the price of silver, the two being intimately connected, would be if anything occurred to increase the export trade from India, because in that way you would increase the demand for silver?—Certainly.

877. I do not think it has been quite ascertained whether the export trade would be likely to be increased if the export duty were repealed?—There would then be a reduction in the price at the port of embarcation.

878. And, therefore, there being a reduction in the price, there would be an increase in the demand, and consequently the demand for silver for remittance would be increased?—No doubt, if the increase in the demand should exceed the reduction in price.

879. That has generally been the case when export duties have been repealed, has it not?—Not invariably, I think, but it is a natural consequence.

LIST OF APPENDIX.

Appendix, No. 1.

PAGE

Paper handed in by Mr. Danvers, 6 March 1879:

Copy of a Despatch from the Secretary of State for India to His Excellency the Right Honourable the Governor General of India in Council - - - - - - - 67

Appendix, No. 2.

Paper delivered in by Sir T. L. Seccombe, 14 March 1879:

Copy of a Despatch from the Secretary of State for India to His Excellency the Right Honourable the Governor General of India in Council - - - - - - - 69

Appendix, No. 3.

Paper handed in by Sir T. L. Seccombe, in answer to Question 429:

Statement showing the Amount Expended on Productive Public Works in each Year from 1867–68 to 1873–74 inclusive, distinguishing that expended on Irrigation Works and State Railways respectively - - - - - - - - - - 72

Appendix, No. 4.

Paper handed in by Sir T. L. Seccombe, in answer to Question 753:

Statement of Sums shown under the Heads of Loss and Gain by Exchange in the East India Finance and Revenue Accounts for the Years from 1873–74 to 1877–78 inclusive, and in the Telegram of 13th March 1879, for the Year 1878–79 - - - 73

Paper handed in by Sir T. L. Seccombe, in answer to Question 867:

Abstract Statement of Remunerative Works in Madras from 1857–58 to 1862–63, published in "Supplement to the Gazette of India, Calcutta, 7 January 1865" - - 73

Appendix, No. 5.

Statement showing the Net Amount of Debt incurred in India and in England, and the Expenditure in Relief of Famine, and on Productiye Public Works, in each Year from 1873–74 to 1878–79 inclusive - - - - - - - - - - - - - - 76

Statement showing the Capital Outlay on Productive Public Works in the Years 1876-77, 1877-78, and 1878–79 - - - - - - - - - - - - - - - 77

Appendix, No. 6.

Paper handed in by Sir T. L. Seccombe, in answer to Question 740:

Statement showing the Cost of Officers, Establishments, and Furlough Allowances, in the Public Works Department, in the Year 1877–78 - - - - - - - 79

Appendix, No. 7.

Paper handed in by the Chairman:

Amount expended on Productive Irrigation Works up to 1866–67 inclusive, and from 1867–68 to 1876-77 - - - - - - - - - - - - - - 80

Statement showing the Amount of Capital expended upon Guaranteed and State Railways respectively, during each of the Years from 1845–46 to 1877–78 - - 80

Appendix, No. 8.

Paper handed in by Sir T. L. Seccombe:

Statement showing the Proportion of the Registered Debt of India, as held by Europeans and Natives respectively, for the Year ending 31st December 1878.—(Prepared on the basis of the Interest paid on each Loan at all the Treasuries throughout India during the Half-year ending 31st December 1878) - - - - - - - - 82

A P P E N D I X.

Appendix, No. 1.

PAPER handed in by Mr. *Danvers*, 6 March 1879.

COPY of a DESPATCH from the Secretary of State for India to His Excellency the Right Honourable the Governor General of India in Council. Appendix, No. 1.

My Lord, India Office, London, 31 July 1878.

Para. 1. I have considered in Council your Excellency's Financial Letter, dated the 2nd of May, No. 186, soliciting approval to the arrangements you have made for delegating to local governments financial responsibility and administrative authority in regard to provincial productive public works, and to the rules you have framed for permitting local governments to raise provincial loans for the construction of such productive public works.

2. On the occasion of moving, on the 9th of February last, that the Report of the Select Committee on the Bill for the licensing of trades and dealings in the Punjab should be taken into consideration by your Council when assembled for the purpose of making laws and regulations, Sir John Strachey made the following observations:—"I "see in another direction also promise of further relief to the Central Government, and of "great benefit to the provincial governments, in respect to the debt to be hereafter "incurred for works of local utility. Both in Bengal and in the North Western Provinces "steps, which have been attended with marked success, have already been taken for "obtaining subscriptions to loans in the localities interested in works of this character. "I hope that it may be found possible to develope and systematise such a means of "providing the capital that may properly be borrowed for works of improvement; and "that local contributions may be successfully sought under conditions which will interest "the classes directly benefited by such works, not only in the provision of the funds "required for their construction, but in the proper management of the works when they "are completed, and in the development of the revenue which they produce."

3. I desire to convey to your Excellency my cordial concurrence in the policy of interesting native landowners and capitalists in the development of the resources of the country, and in the management of works constructed for the purpose of benefiting the neighbourhood of the places in which their property is situated.

4. In furtherance of this policy you express your intention of giving preference, as far as possible, to productive public works which may serve as works of protection of the British provinces against famine, and for which full financial responsibility is undertaken by the local government of the province to be benefited. The rules that have been framed provide that, if any local government desires to construct a productive public work, it must first satisfy your Government as to the character and financial prospects of the scheme; and, on its acceptance by the Government of India and Her Majesty's Government, and on the Provincial Government undertaking financial responsibility for the work, the construction and management will be delegated entirely to the Provincial Government, subject only to a general control on your own part. In special cases, where you are satisfied of the remunerative character of the work, another set of rules which has been issued by your Excellency will permit local governments to raise provincial debenture loans for productive works.

5. In considering the propriety of these regulations, it is essential to arrive at a clear understanding of the extent to which the provincial governments are to be responsible for such loans, and of their effect on the general finances of India. You have provisionally authorised the Government of the North West Provinces to take action under the rules for the construction of a railway from Cawnpore to Furruckabad as a famine relief work; and you have granted a similar permission to the Lieutenant Governor of Bengal in the case of the Patna and Gya Railway, because he has assumed full financial responsibility for the line, and has satisfied you of its financial soundness.

Appendix, No. 1.

6. From the documents forwarded by your Excellency in relation to the latter scheme, I find that the debenture loan, if sanctioned, will form part of the registered public debt of India, and that the debentures will run in the name of the Secretary of State in Council of India, and in the amount of the notes will resemble the general debenture debt of your Government. The chief points in which they differ are that the interest will not be payable within a certain distance of the Presidency towns, and that, if the net receipts of the work shall prove more than sufficient to pay 4 per cent. interest on the debentures and 4½ per cent. interest on money advanced by the Government, they give to the holder a right to share with the Government in the surplus profits.

7. This latter condition is intended to stimulate both the local government and the private subscribers to use their utmost efforts to render it a financial success. It must not, however, be overlooked that the result might disappoint the estimates formed respecting the work, and in that case the provincial government would, under the proposed rules, be bound to make good the interest from other sources at their disposal, in which case demands might arise for larger grants from your Government, while, even if able to satisfy the claims of the debenture holders, the receipts might be insufficient to defray the interest on that portion of the capital which had been advanced from Government funds. Thus there would always be a risk of an ultimate financial burden devolving on the general revenues of the country.

8. It appears to me, therefore, that, in all schemes for carrying into effect the policy of constructing works of public utility by the application of local capital assisted by loans from the Government, no such loans should be granted except as part of the general scheme of your Government for the construction of public works during the year, and I deem it essential that no authority should be given to provincial governments to enter on any productive work of which the amount of charge proposed to be granted as a loan from the Government has not been provided in the general budget, as any other course may involve your Government in liabilities for which no adequate forecast or provision has been made.

9. I am not satisfied, moreover, of the necessity of resorting, for the purposes of these works, to the plan of Government guarantee, which, I need not remind your Excellency, has been admitted to be no longer generally suitable to the circumstances of the country. At all events, I should desire, in the first instance, to try the experiment of raising local capital on the exclusive security of the success of the works, giving to the subscribers every possible interest in the management, and every inducement to economical administration. Not until this has been shown to be impracticable would I have recourse to a system of guarantees, which is now wholly abandoned in respect to Imperial works.

10. I enclose a copy of a telegram which I addressed to your Excellency on the 9th instant, in reply to your telegram of the 26th of June, and I request to be furnished with full particulars of the mode in which the capital required for the Patna-Gya Railway is to be advanced, of the resources from which the receipts are anticipated, and of the prospects which have led your Government to be satisfied with the financial soundness of the work, of which you appear to have entertained doubts when it was first brought to your notice.

11. Subject to the general instructions given in this Despatch, it will give me much satisfaction to find that there is sufficient reason for holding out inducements for the construction of a railway, which in other respects appears likely to be a very useful one to the country through which it is to pass.

I have, &c.
(signed) *Cranbrook.*

Appendix, No. 2.

PAPER delivered in by Sir *T. L. Seccombe*, 14 March 1879.

(Financial, No. 62.)

COPY of a DESPATCH from the Secretary of State for India to His Excellency the Right Honourable the Governor General of India in Council. **Appendix, No. 2.**

My Lord, India Office, London, 20 February 1879.

Para. 1. I HAVE considered in Council your Financial Letter, dated the 16th of September, No. 354, proposing a modification of the rules under which works may be sanctioned that are intended to afford protection against famine, and asking that, in special cases, the condition may be waived "that the annual income from a work must "be estimated to be, within a limited time, equal to the interest charge on its capital "cost."

2. In the Marquis of Salisbury's Despatch of the 23rd of July 1874, No. 387, it was laid down that the only ground on which certain works of irrigation and State railways could with propriety be excluded from the general account of Income and Expenditure, and placed under a separate head of Extraordinary, or, as it is now called, Productive Public Works, was that the works included under that head would "prove remunerative, "by yielding, in the shape of annual income, a sum equal to the interest on the money "expended in their construction; including interest for the period subsequent to the com-"mencement of each work during which no income is obtained." It was, however, added, "in regard to such works as shall be suggested with the view to the prevention of famine, "and which may not come within the class of directly remunerative works," that your Government were not "necessarily to refrain from proposing them, if you should be "unable to meet the expenditure from ordinary income, for, in such a case, the works "might properly be constructed from borrowed money, the expenditure being included "among ordinary charges under a separate head." It was further provided that all funds for productive works must be borrowed in India.

3. Thus the principle was distinctly set forth that none but remunerative works were to be included among those the expenditure on which was excluded from the ordinary accounts; and that, while it might become necessary to borrow for the construction of unremunerative works for the prevention of famine, the charge must be included in the regular accounts as ordinary expenditure.

4. Your Government pointed out that, in your opinion, the adoption of these rules might prove inconvenient, and that, as interest on money borrowed had been paid year by year out of the general revenues, and not provided by increasing debt, the expenditure might be continued on the supposition that any "additional interest on account of money "borrowed for the purpose of constructing extraordinary works will be met from the "increased receipts derived from similar works which have been, or will from time to "time be, completed and brought into operation." To this argument, however, Lord Salisbury replied, in his Despatch of the 10th of August 1876, No. 305, that, "if works "upon which loan funds have been expended are not remunerative to the extent of "repaying the interest on the money expended on them, and additional works be annually "undertaken which will be unremunerative in a similar degree, every additional work "must tend to increase the annual charge for interest which will fall upon the general "revenues." And, bearing in mind the uncertainty regarding the cost of obtaining from India the large supplies needed for the Home Treasury, Lord Salisbury added "that it "would be unjustifiable to undertake, out of moneys to be obtained by borrowing, any "outlay on account of new works, unless their yield will cover the interest of the "loan."

5. This view was accepted by your Government, and Sir John Strachey, in his Financial Statement, on the 15th of March 1877, observed that "it ought clearly to be understood "that, if such charges as those for famine and for unremunerative public works cannot "be provided out of the ordinary revenues, the state of our finances must be unsound. "It cannot be too distinctly stated that charges for the relief of famine must be looked "upon as ordinary charges. For the future, it has been resolved, in communication "with the Secretary of State, that no work shall, under any circumstances, be classed as "extraordinary, unless we are satisfied that it will yield a net income sufficient to cover "the interest upon its capital cost."

6. It had been laid down by Lord Northbrook, in 1874, "that, besides a fair surplus "of income over ordinary expenditure, such a margin should be provided, in addition, in "ordinary times, as shall constitute a reasonable provision for meeting occasional expendi-

Appendix, No. 2.

" ture upon famines;" and, in referring to the subject in the debate of the 27th of December 1877, Sir John Strachey mentioned the argument of Lord Northbrook, "that, " if this surplus were devoted to the reduction of debt, or to preventing the increase of " debt for the construction of reproductive public works, in years of ordinary prosperity, " there would be no objection to the public expenditure exceeding the public revenue in " occasional years of adversity, so that we might then, without objection, meet the charges " on account of famine from borrowed funds, to the full extent to which our surplus had " permitted the discharge of debt, or prevented its increase."

7. The cost of the famines was estimated, on an average of years, at about 1,500,000 *l.*, and provision was made for meeting this expenditure by measures of financial decentralisation and by new taxation. " The Government of India," said Sir John Strachey, " in- " tends to keep this million and a half as an insurance against famine alone; . . . . . " we consider that the estimates of every year ought to make provision for religiously " applying the sum I have mentioned to this sole purpose; and I hope that no desire to " carry out any administrative improvement however urgent, or any fiscal reform how- " ever wise, will tempt the Government to neglect this sacred trust."

8. On the 9th of February 1878, Sir John Strachey explained in greater detail the mode by which it was proposed to deal with the additional sum raised to meet the famine expenditure. It being a portion of the policy of the Government to borrow certain sums annually for the construction of reproductive works, this amount would be reduced, and the annual addition to the public debt would be proportionately diminished, by the appropriation of the million and a half raised for famine purposes, so that, when, on the occurrence of a famine, it became necessary to borrow, the amount of the debt would remain no higher than if the receipts to meet the famine expenditure and the corresponding outlay had not been brought into the account. " The soundness of this " argument," he observed, " depends of course on the assumption that the works which " are constructed from our annual contribution of 1,500,000 *l.* from the public revenues " will be really reproductive, that is, that they will at the end of the 10 years produce an " income at least equal to the interest which we should have to pay, if we had then to " replace by borrowing a sum equal to that furnished from the new taxes for their con- " struction." Arrangements were to be made with the local governments, throwing on them to a great extent the responsibility of protecting the people from famine in the manner prescribed; " the provincial revenues," he stated " will have to supply to the " Imperial Treasury, or to hold at its disposal, year by year, a sum equal to the interest " on the capital expended on all the reproductive works, constructed either with " borrowed money or funds supplied from the new taxes." In this mode, said Sir John Strachey, the 1,500,000 *l.* to be provided as an insurance against famine would be applied " virtually to the reduction of debt; and, when the calamity of famine actually " arrives, we hope not only to be able to meet it without throwing fresh burdens upon " the country, but to find that our means of giving efficient relief have been immensely " increased by the useful works which we have carried out in the preceding years of " prosperity."

9. These views were repeated, in almost the same words, in the letter from your Government, dated the 4th of January 1878, No. 7; and a general apppoval of your proposals was given by Lord Salisbury, in his telegram of the 12th of January, and again in his Despatch of the 1st of April last, No. 104, in which, however, he observed, that " it is " necessary that, whenever the demand for bills and the state of the exchange will admit, " the sum which has been provided from the Home Treasury to meet famine expenditure " should be repaid from the million and a half which is to be raised annually on account " of famines."

10. With the view of carrying into effect the policy on which you had determined, your Government published in the Gazette of India Extraordinary for the 18th of March a Resolution, No. 1911, defining the method in which it was to be put in operation through the agency of the local governments. " It will manifestly be a necessary condi- " tion of success," it was observed,* " in carrying out such a policy, that the works under- " taken shall in fact produce the growing income from which to meet the gradual increase " of interest charge; and it therefore becomes essential to examine very strictly the " character of all projects brought forward for execution, so that borrowed capital shall " not, under any circumstances, be suppled for any work of which it cannot reasonably " be anticipated that it will in a definite period of time produce a net income at least as " great as the interest on the capital outlay upon it. Further, the same limitation " . . . must also be applied to . . . . the new resources lately specially created " to provide a surplus from which to meet charges on account of the relief or prevention " of famine." The justification for granting, for productive works, funds from the surplus " revenues which might otherwise be applied to the extinction of debt, is that, so far as it " prevents an increase of debt, it will virtually be equivalent to a corresponding discharge " of debt, a condition, however, that cannot be fulfilled unless the works are properly " remunerative." The " dead weight of interest charge during the time when the income " of the works is not fully developed" might, however, " properly be met from the " provincial revenues at the disposal of the local governments for carrying out works of " internal improvement."

* Paras. 76—79.

11. These are the conditions which, in the letter now under my consideration, your Excellency

Excellency proposes to modify, in order to complete the transfer of the liability for Productive Public Works to the provincial revenues, and to meet the case of works not in themselves fully productive, but intended to give protection against famine, some of which have actually been begun during the late seasons of distress.

12. You explain that, in sanctioning the execution of a work from borrowed money, the cost of which was to fall on the general revenues of the country, you have hitherto, subject to the sanction of the Secretary of State, decided on the merits of each case whether or not the risk of constructing it should be incurred, with reference to the period within which it might be reasonably expected to become remunerative; and you are of opinion that this principle may be extended to the action of the provincial governments. At the same time you observe that, if unremunerative works are carried out from the money provided for the cost of counteracting famines, under conditions which reduce the surplus so provided beyond a certain limit, additional taxation will be eventually required to make good the loss. But, owing to the difficulty of discriminating between works strictly productive and those only admissible as providing against the effect of famine, you propose "to accept a yearly maximum dead-weight charge, to be fixed as "experience may suggest, for works constructed as productive, whether under the exist-"ing strict conditions, or, as now proposed, in order to prevent famine, or give protection "from famine, or diminish the expenditure for the counteraction of famine if it occurs. "In other words," you "would limit to a specific maximum amount the net expenditure "for the interest on the capital cost of all such works and their maintenance, after setting "off all the net income yielded by the works."

13. This amount you would, for the next five years, fix at 25 lacs of rupees in any one year, in addition to your "existing net liabilities," and you think that the Famine Insurance Fund of one million and a half sterling may be safely reduced by that sum, on the consideration that the construction of any works not fully productive, according to the existing definition, which may be thus facilitated, will cause an equivalent reduction of your ultimate liability on account of famines when they occur.

14. In this manner you believe that the local governments will be provided with the means of undertaking works for protection against famine, while a safeguard will be furnished against the improvident extension of liabilities for works of which the remunerative character is doubtful, and the financial responsibility, which has hitherto rested almost exclusively on the Government of India, will be shared by the local governments in a manner practically useful and conducive to the exercise of forethought and economy.

15. With this view, you request sanction to a relaxation of the rules under which productive works may at present be undertaken, so that, in exceptional cases, works may be included in that class which are not directly remunerative, provided—

"1. That a work will be unquestionably useful for the prevention of famine, or "as giving protection therefrom, or that, upon the occurrence of famine, it will "probably cause reduction of the public expenditure commensurate with its "cost.

"2. That the total net yearly charge imposed upon the revenues of India, for "the maintenance and payment of interest upon the capital invested in productive "works of all classes, after setting off the income they produce, shall not, till the "end of 1883-84, exceed the corresponding net yearly charge at the present time "by more than 25 lacs of rupees."

16. I have given a most careful consideration to this important question, and regret that I am unable to give my consent to the modification proposed. At the time that your letter was received, Sir John Strachey was in this country, and, with the advantage of the personal explanations received from him, I was in hopes that I might have been able, even if not sanctioning the proposal in the exact form made by your Government, to have sanctioned arrangements which would have been accepted by you as satisfactorily meeting your desire to proceed rapidly with the construction of protective works.

17. The events of the last few months, and their effect on our financial position have, however, compelled me to re-consider the question of public works expenditure, and I propose to address your Excellency in another despatch on this subject. In the meantime, however, I deem it necessary to express the opinion that the present condition of the finances does not justify any loan for outlay on protective works, or any expenditure on them beyond what may be met from the receipts from the special taxation recently imposed.

18. The first claim on these receipts being that of the Home Government for the repayment of debt already incurred on account of famine, I am of opinion that not less than one-half, or say 750,000 *l.*, should be held available for remittance to England in the next and ensuing years on that account. The remainder may be appropriated, at your discretion, to the extinction of debt, to the relief of famine, or to the construction of protective works, not necessarily directly remunerative, but obviously productive in the sense of guarding against a probable future outlay in the relief of the population. I cannot, however, under present circumstances, sanction the raising of capital by loan for the

Appendix, No. 2. construction of works which do not distinctly fall under the regulations laid down for Productive Public Works.

19. To guard against misapprehension, I deem it necessary to draw attention to a statement in the concluding paragraphs of your letter, that you have omitted from the definition of productive works the condition prescribed in the 49th paragraph of the Despatch of the 23rd of July 1874, that they must be expected "to be remunerative, by "yielding, in the shape of annual income, a sum equal to the interest on the money "expended in their construction, including interest for the period subsequent to the "commencement of each work during which no income is obtained." This omission you infer that you are justified in making by the tenor of Lord Salisbury's Despatch of the 27th of September 1877, No. 310 A. In that Despatch, which directed that the term Productive should be adopted instead of Extraordinary, and that the results should be exhibited in a new form, it was expressly stated "that no change is intended to be made "in the character of the works henceforth to be admitted into this category." For the inclusion of any work in the productive class, it is necessary that there should be a prospect of its repaying, within a reasonable time, the whole of the interest incurred on the money expended in its construction, though it is immaterial whether the interest which accrued during the process of construction be treated as a charge against the income of future years, or be added to the capital on which interest is to be paid.

I have, &c.
(signed) *Cranbrook.*

Appendix, No. 3.

PAPER handed in by Sir *T. L. Seccombe,* in answer to Question 429.

Appendix, No. 3. STATEMENT showing the AMOUNT expended on PRODUCTIVE PUBLIC WORKS in each Year from 1867–68 to 1873–74 inclusive, distinguishing that expended on IRRIGATION WORKS and STATE RAILWAYS respectively.

	Irrigation Works.	State Railways.	TOTAL.
	£.	£.	£.
1867-68 - - - -	219,255	594	219,849
1868-69 - - - -	468,849	552,398	1,021,247
1869-70 - - - -	2,007,361	190,870	2,198,231
1870-71 - - - -	718,438	449,372	1,167,810
1871-72 - - - -	983,854	644,620	1,628,474
1872-73 - - - -	770,920	1,413,649	2,184,569
1873-74 - - - -	1,198,682	2,354,625	3,553,307
£.	6,367,359	5,606,128	11,973,487

India Office,
20 March 1879.

Thos. W. Keith, Accountant.

Appendix, No. 4.

PAPER handed in by Sir *T. L. Seccombe*, in Answer to Question 753.

STATEMENT of Sums shown under the Heads of Loss and Gain by Exchange in the East India Finance and Revenue Accounts for the Years from 1873–74 to 1877–78 inclusive, and in the Telegram of the 13th March 1879 for the Year 1878–79.

Year.	Loss by Exchange.	Gain by Exchange.	Net Loss by Exchange.
	£.	£.	£.
1873–74	986,530	395,168	591,362
1874–75	897,878	395,335	502,543
1875–76	1,429,658	395,365	1,034,293
1876–77	2,181,611	505,129	1,676,482
1877–78 (Regular Estimate)	1,616,000	520,000	1,096,000
1878–79 (Regular Estimate, as per Telegram)	3,400,000	- -	3,400,000
£.	10,511,677	2,210,997	8,300,680

India Office, 22 March 1879. *Thos. W. Keith*, Accountant.

PAPER handed in by Sir *T. L. Seccombe*, in Answer to Question 867.

ABSTRACT STATEMENT of Remunerative Works in *Madras* from 1857-58 to 1862–63, published in "Supplement to the Gazette of India, Calcutta, 7 January 1865."

Name of Work.	Year.	Capital. Estimated Value of Works.	Revenue. Net Income for the Year, after Paying 4 per Cent. Interest on Capital. Amount.	Rate per Cent. on Capital.	Net Charge for the Year, including Payment of 4 per Cent. Interest on Capital. Amount.	Rate per Cent. on Capital.	Aggregate Financial Result. Profit.	Loss.
		Rs.	*Rs.*		*Rs.*		*Rs.*	*Rs.*
(1.) Godavery Anicut with subsidiary works -	1857–58	32,61,105	3,68,240	11·3	–	–	40,32,053	—
	1858–59	31,73,116	6,52,705	20·6	–	–	44,80,311	—
	1859–60	32,11,683	9,54,824	29·7	–	–	54,01,867	—
	1860–61	32,07,372	18,06,376	56·3	–	–	71,74,256	—
	1861–62	32,38,357	13,83,441	42·7	–	–	85,23,413	—
	1862–63	33,77,504	14,59,921	43·2	–	–	94,98,398	—
(2.) Kistna Anicut - -	1857–58	13,26,007	68,659	5·2	–	–	2,245	—
	1858–59	14,25,312	69,461	4·9	–	–	52,326	—
	1859–60	15,44,309	1,50,526	9·7	–	–	1,72,155	—
	1860–61	16,31,721	1,27,744	7·8	–	–	2,66,208	—
	1861–62	17,28,457	1,74,510	10·1	–	–	4,04,605	—
	1862–63	19,12,699	2,11,500	11·05	–	–	5,77,335	—
(3.) Pennair Anicut - -	1857–58	1,24,634	- -	–	4,230	3·3	13,118	—
	1858–59	1,29,781	8,144	6·2	–	–	- -	28,738
	1859–60	1,74,548	- -	–	8,387	4·8	- -	39,475
	1860–61	2,19,929	- -	–	10,178	4·6	- -	49,653
	1861–62	2,54,723	- -	–	958	0·3	- -	50,611
	1862–63	2,55,513	- -	–	1,760	0·6	- -	52,371
(4.) Bachagondanahully Anicut - - -	1858–59	11,477	- -	–	466	4·0	- -	6,054
	1859–60	11,964	- -	–	821	6·9	- -	6,875
	1860–61	11,964	985	8·4	–	–	- -	5,910
	1861–62	11,964	875	7·3	–	–	- -	5,035
	1862–63	11,964	900	7·5	–	–	- -	3,412
(5.) Palar Anicut in Madras - - -	1858–59	38,953	4,180	10·7	–	–	25,133	—
	1859–60	39,283	5,596	14·2	–	–	30,729	
	1860–61	39,462	- -	–	1,571	4·0	29,160	—
	1861–62	59,264	- -	–	1,578	2·6	27,582	—
	1862–63	1,36,413	5,777	4·2	–	–	33,339	—

ABSTRACT STATEMENT of Remunerative Works in *Madras* from 1857–58 to 1862–63—*continued.*

NAME OF WORK.	Year.	CAPITAL. Estimated Value of Works.	REVENUE. Net Income for the Year, after Paying 4 per Cent. Interest on Capital. Amount.	Rate per Cent. on Capital.	Net Charge for the Year, including Payment of 4 per Cent. Interest on Capital. Amount.	Rate per Cent. on Capital.	AGGREGATE FINANCIAL RESULT. Profit.	Loss.
		Rs.	*Rs.*		*Rs.*		*Rs.*	*Rs.*
(6.) Coratoor and Casaveram Anicut	1858–59	33,111	- -	–	164	·5	47,506	—
	1859–60	36,746	26,559	72·2	–	–	74,065	—
	1860–61	36,746	- -	–	2,571	7·0	71,494	—
	1861–62	36,746	- -	–	1,657	4·5	69,837	—
	1862–63	36,746	6,753	18·3	–	–	76,590	—
(7.) Palar Anicut in North Arcot	1857–58	5,15,977	- -	–	17,010	3·2	- -	36,806
	1858–59	5,39,946	- -	–	12,366	2·2	- -	48,536
	1859–60	5,39,946	- -	–	18,830	3·4	- -	67,366
	1860–61	5,43,213	- -	–	17,140	3·1	- -	84,506
	1861–62	5,79,391	- -	–	18,966	3·2	- -	1,03,472
	1862–63	6,39,213	- -	–	16,584	2·5	- -	1,20,056
(8.) Ponnie Anicut	1857–58	47,481	- -	–	2,610	5·4	- -	141
	1858–59	47,481	- -	–	872	1·8	- -	4,330
	1859–60	47,762	- -	–	1,795	3·7	- -	6,125
	1860–61	47,762	- -	–	2,633	5·5	- -	8,758
	1861–62	57,763	- -	–	2,324	4·0	- -	11,082
	1862–63	83,009	- -	–	1,291	1·5	- -	12,373
(9.) Cheyar Anicut	1857–58	12,088	- -	–	850	7·	5,782	—
	1858–59	12,088	2,134	17·6	–	–	17,183	—
	1859–60	12,088	635	5·2	–	–	17,818	—
	1860–61	46,018	- -	–	1,986	4·3	7,829	—
	1861–62	47,518	- -	–	1,575	3·3	6,254	—
	1862–63	47,518	- -	–	391	0·8	5,863	—
(10.) Lower Coleroon Anicut, in South Arcot	1857–58	1,16,469	3,34,528	287·2	–	–	45,66,589	—
	1858–59	1,16,469	3,72,098	319·4	–	–	49,38,687	—
	1859–60	1,16,469	3,30,158	283·4	–	–	52,68,845	—
	1860–61	1,16,469	3,67,785	315·8	–	–	56,36,630	—
	1861–62	1,16,469	3,98,316	341·9	–	–	60,34,946	—
	1862–63	1,16,469	3,99,244	342·7	–	–	64,34,190	—
(11.) Vellar Anicut	1857–58	82,156	61,534	74·3	–	–	5,28,824	—
	1858–59	82,156	69,017	84·0	–	–	5,97,841	—
	1859–60	82,156	70,348	85·6	–	–	6,68,189	—
	1860–61	82,156	81,944	100·3	–	–	7,50,133	—
	1861–62	82,156	94,011	114·4	–	–	8,44,144	—
	1862–63	82,156	1,01,803	123·9	–	–	9,45,947	—
(12.) Ragavaiyen Channel	1857–58	8,023	29,284	365·0	–	–	2,19,508	—
	1858–59	7,443	30,012	403·2	–	–	2,48,940	—
	1859–60	7,443	24,463	328·6	–	–	2,73,403	—
	1860–61	7,443	30,330	407·5	–	–	3,03,733	—
	1861–62	7,443	30,762	413·3	–		3,34,495	—
	1862–63	62,281	32,087	51·5	–	–	3,66,582	—
(13.) Teruvadi Anicut	1857–58	11,455	25,130	219·3	–	–	2,27,568	—
	1858–59	11,455	24,975	218·0	–		2,52,543	—
	1859–60	11,455	20,591	179·7	–	–	2,73,134	—
	1860–61	11,455	30,403	265·4	–	–	3,03,537	—
	1861–62	11,455	29,437	256·9	–	–	3,32,974	—
	1862–63	11,455	30,788	268·7	–	–	3,63,762	—
(14.) Vicravandi Anicut	1857–58	13,716	1,583	11·5	–	–	- -	709
	1858–59	13,716	1,625	11·8	–	–	916	—
	1859–60	13,716	2,531	18·4	–	–	3,447	—
	1860–61	13,716	4,324	31·5	–	–	7,771	—
	1861–62	13,716	4,508	32·8	–	–	12,279	—
	1862–63	13,716	4,733	34·5	–	–	17,012	—

ABSTRACT STATEMENT of Remunerative Works in *Madras* from 1857–58 to 1862–63—*continued.*

NAME OF WORK.	Year.	CAPITAL. Estimated Value of Works.	REVENUE. Net Income for the Year, after Paying 4 per Cent. Interest on Capital. Amount.	Rate per Cent. on Capital.	Net Charge for the Year, including Payment of 4 per Cent. Interest on Capital. Amount.	Rate per Cent. on Capital.	AGGREGATE FINANCIAL RESULT. Profit.	Loss.
		Rs.	*Rs.*		*Rs.*		*Rs.*	*Rs.*
(15.) Upper Coleroon Anicut, in Tanjore -	1857–58	2,39,866	15,93,239	664·2	–	–	76,96,199	—
	1858–59	2,39,865	17,50,902	729·9	–	–	94,47,101	—
	1859–60	2,39,865	5,06,101	210·9	–	–	99,53,203	—
	1860–61	2,39,865	5,19,003	216·4	–	–	1,04,72,206	—
	1861–62	2,39,865	5,72,050	238·4	–	–	1,10,44,256	—
	1862–63	2,39,866	6,37,533	265·7	–	–	1,16,81,808	—
(16.) Lower Coleroon Anicut, in Tanjore -	1857–58	2,25,190	5,802	2·6	–	–	1,61,111	—
	1858–59	2,25,190	- -	–	20,375	9·0	1,40,739	—
	1859–60	2,25,190	- -	–	2,793	1·2	1,37,945	—
	1860–61	2,25,190	4,969	2·1	–	–	1,42,914	—
	1861–62	2,25,160	10,308	4·5	–	–	1,53,222	—
	1862–63	2,25,190	10,757	4·7	–	–	1,63,980	—
(17.) Kaniempolliem Anicut	1857–58	42,970	- -	–	1,080	2·5	- -	31,218
	1858–59	42,970	- -	–	1,681	3·9	- -	32,899
	1859–60	42,970	- -	–	1,953	4·5	- -	34,852
	1860–61	42,970	- -	–	2,230	5·2	- -	37,082
	1861–62	42,970	- -	–	1,787	4·1	- -	38,869
	1862–63	42,970	- -	–	1,248	2·9	- -	40,117
(18.) Yennamakal Dam -	1857–58	28,718	253	·8	–	–	- -	3,871
	1858–59	23,468	1,711	7·2	–	–	- -	5,645
	1859–60	22,851	499	1·9	–	–	- -	5,813
	1860–61	22,233	- -	–	6,968	31·4	- -	13,399
	1861–62	21,615	- -	–	4,541	21·	- -	18,558
	1862–63	20,998	1,489	7·	–	–	- -	17,686
(19.) Nundyar Anicut -	1861–62	46,850	2,616.	5·5	–	–	9,170	—
	1862–63	46,850	434	0·9	–	–	9,604	—
(20.) Eastern Coast Canal -	1858–59	4,97,417	1,946	·3	–	–	4,39,708	—
	1859–60	4,97,417	- -	–	7,576	1·5	4,32,132	—
	1860–61	4,97,417	- -	–	8,867	1·8	4,23,265	—
	1861–62	5,04,091	- -	–	4,421	0·8	4,18,844	—
	1862–63	5,04,091	2,483	·4	–	–	4,21,231	—
(21.) Thaddapully Channel, in the District of Coimbatore - -	1862–63	24,898	- -	–	3,928	15·7	- -	19,021
(22.) Calingaroyen Channel, in the District of Coimbatore - -	1862–63	15,284	- -	–	8,301	54·3	- -	35,821
(23.) Arakencottah Channel, in the District of Coimbatore - -	1862–63	11,126	- -	–	2,074	18·6	- -	2,074

REMARKS.

The net income has been calculated by assuming, as the standard of comparison, the average of the revenue derived from the land capable of irrigation by the anicut for five years previous to the construction of the work, and setting down all excess above that average, less the cost of repairs, interest on capital, and other charges as the increase due to the anicut in subsequent years. In thus fixing the income, other causes independent of irrigation, such as improved cultivation, increase of population, &c., have not been taken into account.

Further, this net annual profit includes the assessment of the land, as well as the value of the water actually supplied, and attributes all increase in the land revenue to the work, being so far a more favourable mode of calculation than is strictly correct; but, on the other hand, it leaves out of account all increase in other sources of revenue, viz., salt, abkarry, &c., though these may be affected by the improved condition of the people, consequent on the more profitable character of irrigated cultivation.

Where a work has been kept in proper repair, and all the maintenance and conservancy charges added to such expenses, no deduction has been made on account of deterioration by wear and tear from the capital expended in the work.

(signed) *R. Strachey*, Colonel, R.E.,
Secretary to Government of India, P.W.D.

Appendix, No. 5.

Appendix, No. 5.

STATEMENT showing the Net Amount of DEBT incurred in *India* and in *England*, and the EXPENDITURE in RELIEF of FAMINE, and on PRODUCTIVE PUBLIC WORKS, in each Year from 1873–74 to 1878–79 inclusive.

DEBT INCURRED.

YEARS.	INDIA.	ENGLAND.	TOTAL.	
	£.	£.	£.	
1873–74	*41,078**	5,000	*36,078*	
		2,100,000	2,100,000	For redemption of East India Stock.
1874–75	3,432,669	2,479,416	2,479,416	For redemption of East India Stock.
		5,000,000	8,432,669	
1875–76	2,923,022	1,200,000	4,123,022	
1876–77	*849,855**	5,600,000	4,750,145	
1877–78	3,031,878	4,280,000	7,311,878	
1878–79	2,494,143†	222,084‡	2,716,227	
£.	10,990,779	20,886,500	31,877,279	

* The sums printed in *italics* represent the net amount of debt discharged in the year.
† To latest advices. ‡ To 1st March 1879 inclusive.

EXPENDITURE.

YEARS.	Famine Relief.	Productive Public Works.	TOTAL.
	£.	£.	£.
1873–74	3,864,673	3,553,307	7,417,980
1874–75	2,237,860	4,249,571	6,487,431
1875–76	508,554	4,270,629	4,779,183
1876–77	2,145,431	3,809,284	5,954,715
1877–78 (Regular Estimate.)	5,231,309	4,903,285	10,134,594
1878–79 (Budget Estimate.)	500,000	4,555,000	5,055,000
£.	14,487,827	25,341,076	39,828,903

India Office,
29 March 1879.

Thos. W. Keith,
Accountant General.

STATEMENT showing the CAPITAL outlay on PRODUCTIVE PUBLIC WORKS in the Years 1876–77, 1877–78, and 1878–79.

PRESIDENCY OR PROVINCE.	WORK.	Capital outlay excluding all Indirect Charges.		
		1876–77.	1877–78.	ESTIMATE, 1878–79.
	IRRIGATION:	£.	£.	£.
RAJPUTANA	Bheer Reservoir	8	—	—
	Inlea Reservoir	3,315	—	—
	Bulad Reservoir	54	—	—
BENGAL	Orissa Project	72,244	46,612	275,000
	Midnapore Series	38,358	21,689	
	Soane Project	217,707	169,132	
	Tidal Canal	1,452	—	—
NORTH WESTERN PROVINCES	Ganges Canal	105,669	84,726	260,000
	Agra Canal	48,067	14,864	
	Lower Ganges Canal	197,620	176,164	
	Rohilcund Canal	8,916	—	—
	Bundlecund Irrigation Survey	2,337	—	—
	Eastern Ganges Canal	80	—	—
	Eastern Jumna Canal	20,734	—	—
PUNJAB	Western Jumna Canal	51,691	87,397	96,000
	Bari Doab Canal (including Madhopur Workshops)	15,788	12,063	15,000
	Sirhind Canal:			
	British Expenditure	105,679	114,727	230,000
	Expenditure from Contribution	99,094	87,697	
	Upper Sutlej Inundation Canals	808	—	—
	Lower Bari Doab Special Survey	4,087	—	—
	Swat River Canal	5,318	18,617	—
	Dirajat Canal Special Survey	4,633	—	—
MADRAS	Godavery Delta System	24,613	26,016	60,000
	Kristna Delta System	6,122	6,381	
	Poonair Anicut System	6,018	788	
	Chembrambakam Tank	196	-	
	Palondorai Anicut System	416	-	
	Cauvery Delta System	70	1,116	
	Stiwaiguntum Anicut System	4,566	1,291	
	Perryaur Project	-	-	
	Rooshkoolia Project	-	-	
	Madras Water Supply Project	5,000	-	

STATEMENT showing the Capital outlay on Productive Public Works, &c.—*continued.*

PRESIDENCY OR PROVINCE.	WORK.	Capital outlay excluding all Indirect Charges. 1876–77.	1877–78.	ESTIMATE, 1878–79.
	IRRIGATION—*continued.*	£.	£.	£.
	Hathmatti Canal	2,492	1,793	
	Lakh Canal	- -	28	
	Palkhair Canal	123	63	
	Malaprabha Project Survey	- -	- -	
	Ghattaprabha Project Survey	- -	- -	
	Panjhra Irrigation Works	1,888	4	
BOMBAY (DEKKAN)	Moota Storage Lake and Canal	57,856	23,905	
	Nira Project	3,489	- -	60,000
	Krishna Canal	184	848	
	Ekrook Tank	2,839	1,292	
	Bhima and Sina Project Survey	- -	- -	
	Tapti River Survey	54	- -	
	Eastern Nara Works	3,060	12,933	
BOMBAY (SIND)	Bigari Canal	17,030	6,301	
	Sukkur and Shahadadpur Canal	3,402	2,234	
	TOTAL IRRIGATION £.	1,130,133	918,718	996,000
	STATE RAILWAYS:			
	Calcutta and South Eastern	708	—	—
	Nulhati	- -	- -	10,000
	Rajputana	157,123	150,302	94,000
	Holkar	145,673	71,920	55,500
	Wardah Valley	75,076	19,380	12,000
	Punjab, Northern	334,610	307,875	513,000
	Indus Valley	960,648	1,289,638	560,000
	Northern Bengal	377,945	433,736	311,720
	Neemuch (Indore to Nussurabad)	150,674	208,405	235,000
	Rangoon and Irrawaddy	353,508	245,178	106,000
	Sindia	172,329	174,048	249,500
	Tirhoot	155,616	89,568	59,750
	Western Rajputana	10,843	180,430	581,780
	Nagpur and Chutteesgurh	7,850	3,434	100,000
	Dhond and Manmar	- -	543,525	260,000
	Patna and Gya	- -	1,878	180,000
	Cawnpoor and Ferruckabad	- -	- -	150,000
	Reserved and Director of Stores	- -	- -	87,550
	TOTAL STATE RAILWAYS £.	2,901,187	3,719,317	3,555,000
	GRAND TOTAL £.	4,031,320	4,638,035	4,551,000

31 March 1879.

Henry Waterfield, Financial Secretary.

Appendix, No. 6.

PAPER handed in by Sir *T. L. Seccombe*, in Answer to Question 740.

Appendix No. 6.

STATEMENT showing the COST of OFFICERS, ESTABLISHMENTS, and FURLOUGH ALLOWANCES, in the PUBLIC WORKS DEPARTMENT, in the Year 1877–78.

	£.	£.
ESTABLISHMENT CHARGES FOR ORDINARY WORKS:		
Charged against Imperial Funds:		
Buildings and Roads	332,574	
Irrigation and Agriculture	334,288	
Engineering College (Roorkee)	19,910	
Collieries	746	
		687,518
Charged against Provincial Funds:		
Provincial Services proper	611,494	
Contributed by Private Persons, Local Funds, Deposits, &c.	174,843	
Provincial Railways	7,357	
		793,694
ESTABLISHMENT CHARGES FOR PRODUCTIVE WORKS:		
Irrigation	170,488	
State Railways, Capital Account	333,780	
State Railways, Working Expenses *	189,339	
Guaranteed Railways, Supervision, &c.	52,710	
		746,317
GENERAL CHARGES:		
Salary of Member of Council	8,000	
Secretariat, Chief Office of Account, &c.	59,749	
Furlough Allowances	67,703	
Engineering College (Cooper's Hill), Net	2,173	
Expenses on account of Examination of Candidates	2,176	
Expenses of Officers and Students visiting Works in England, &c.	2,669	
		142,470†
TOTAL £.		2,369,999

* In the Finance and Revenue Accounts the charge for Establishment is not separated from the other Working Expenses of State Railways; estimated at 45 per cent. (the proportion shown in the Budget), it amounts to 189,339 *l.*, the total Working Expenses being 420,754 *l.*

† There are no sufficient data at present for determining the amount of pensions entailed by the operations of the Public Works Department.

India Office,
31 March 1879.

Henry Waterfield,
Financial Secretary.

Appendix, No. 7.

PAPER handed in by the *Chairman*.

Appendix, No. 7.

AMOUNT expended on Productive IRRIGATION WORKS.

	State.	Madras Irrigation and Canal Company.	TOTAL.
	£.	£.	£.
Up to 1866–67 inclusive - - - -	6,612,495	964,833	7,577,328
1867-68 to 1876–77 - - - - -	9,651,618	406,833	10,058,451
TOTAL - - - £.	16,264,113	1,371,666	17,635,779

STATEMENT showing the Amount of Capital expended upon GUARANTEED and STATE RAILWAYS respectively, during each of the undermentioned Years.

YEAR.	Guaranteed Railways.	State Railways.	TOTAL.
	£.	£.	£.
1845–46 - - - - -	—	—	—
1846–47 - - - - -	—	—	—
1847–48 - - - - -	—	—	—
1848–49 - - - - -	—	—	—
1849–50 - - - - -	75,893	- - -	75,893
1850–51 - - - - -	99,263	- - -	99,263
1851–52 - - - - -	351,323	- - -	351,323
1852–53 - - - - -	427,560	- - -	427,560
1853–54 - - - - -	670,649	- - -	670,649
1854–55 - - - - -	1,730,156	- - -	1,730,156
1855–56 - - - - -	3,366,411	- - -	3,366,411
1856–57 - - - - -	3,515,100	- - -	3,515,100
1857–58 - - - - -	3,423,068	- - -	3,423,068
1858–59 - - - - -	5,492,108	- - -	5,492,108
1859–60 - - - - -	7,171,464	- - -	7,171,464
1860–61 - - - - -	7,578,715	- - -	7,578,715
1861–62 - - - - -	6,602,212	- - -	6,602,212
1862–63 - - - - -	5,863,344	- - -	5,863,344
1863–64 - - - - -	4,755,653	- - -	4,755,653
1864–65 - - - - -	4,122,240	- - -	4,122,240
1865–66 - - - - -	5,636,866	- - -	5,636,866
1866–67 - - - - -	7,297,703	- - -	7,297,703
1867–68 - - - - -	7,120,081	594	7,120,675
1868–69 - - - - -	3,867,927	552,398	4,420,325
1869–70 - - - - -	4,742,851	190,870	4,933,721
1870–71 - - - - -	3,776,270	449,372	4,225,642
1871–72 - - - - -	2,496,728	644,620	3,141,348
1872–73 - - - - -	477,245	1,413,649	1,890,894
1873–74 - - - - -	693,053	2,354,625	3,047,678
1874–75 - - - - -	1,087,911	3,014,180	4,102,091
1875–76 - - - - -	950,806	3,165,184	4,115,990
1876–77 - - - - -	715,459	2,865,861	3,581,320
1877–78 - - - - -	1,312,250	3,984,968	5,297,218
£.	95,420,309	18,636,221	114,056,630

Appendix, No. 7.

My Lord, Bellary, Madras Presidency, 5 April 1879.

MR. SAMPSON LLOYD having communicated to me your Lordship's desire that I should send to you, direct, the statement of the traffic on the Godavery Canals, to support the evidence I had given last year before your Committee, I beg to transmit the same, as below:—

STATEMENT of Traffic in the Godavery Canals for 1877–78.

1.—Number of passenger boats licensed	120
2.—Number of cargo boats licensed	1,671
3.—Register tonnage, cargo boats	36,011
4.—Timber rafts	3,639
5.—Tonnage in canals	536,672
6.—Ton mileage	12,658,265
	£.
7.—Value of cargoes estimated or declared	3,696,502
8.—Navigation receipts	4,496

I regret to say the number of passengers is not given, but 120 boats took out licenses, and these carry on an average 50 a day. I beg further to add, that during this most awful season of famine, the worst probably ever known in India, when the districts of this presidency, through which the railways run, lost over 85 per cent. of their revenues, two-thirds of the population, and the whole of their products, for not an acre of land can be made to yield any products by a railway when the rains fail; the Godavery district, by means of its canals, paid double the revenue it had even yielded in the most prosperous years before these works were constructed, carried on a trade nearly 40 fold in value to what this was when these works were undertaken, and came out of the trial strengthened in all its resources, whilst India has been brought to bankruptcy in spite of all endeavours to bolster up the railway system. If the condition of industry in India had been at all considered and compared with that existing at home, this waste of money, and time, and life would never have been allowed, but now I fear it will be long before India recovers, if she even does at all, for it is appalling to see the state of these districts.

I have, &c.
(signed) *Jno. F. Fischer*,
Colonel, R.E.

Appendix, No. 8.

PAPER handed in by Sir *T. L. Seccombe*.

STATEMENT showing the Proportion of the REGISTERED DEBT of *India*, as held by EUROPEANS and NATIVES respectively, for the Year ending 31st December 1878.—(Prepared on the basis of the Interest paid on each Loan at all the Treasuries throughout *India* during the Half-year ending 31st December 1878.)

LOANS.	CALCUTTA.		BOMBAY.		MADRAS.		MOFUSSIL.		TOTAL.		GRAND TOTAL.	Balance of Principal not presented for Interest.	Amount held in London.	Amount of Debt on 31 Dec. 1878.
	Europeans.	Natives.	Europeans.	Natives.	Europeans.	Natives.	Europeans.	Natives.	Europeans.	Natives.				
	Rs.	*Rs.*	*Rs.*	*Rs.*	*Rs.*	*Rs.*	*Rs.*	*Rs.*	*Rs.*	*Rs.*	*Rs.*	*Rs.*	*Rs.*	*Rs.*
4 Per Cent. Loan of 1824–25	1,600	17,920	- -	320	- -	- -	- -	34,453	1,600	52,693	54,293	2,25,174	38,506	3,17,973
4 - ditto - 1828–29	46,506	6,400	- -	213	16,614	- -	- -	1,000	63,120	7,613	60,733	14,174	2,346	87,253
4 - ditto - 1832–33	51,07,946	10,52,693	1,24,498	93,294	8,63,928	5,325	3,89,120	4,23,146	64,85,492	15,74,458	80,59,950	24,77,117	14,47,253	1,19,84,320
4 - ditto - 1835 36	49,58,800	67,75,300	10,85,500	11,09,700	9,26,200	97,900	4,48,200	58,58,000	74,18,700	1,38,40,900	2,12,59,600	48,39,900	31,18,600	2,92,18,100
4 - ditto - 1842–43	5,56,17,800	1,53,85,800	1,03,46,400	69,58,600	1,04,09,400	17,08,400	39,98,200	62,31,300	8,03,71,800	3,02,84,100	11,06,55,900	4,26,72,000	2,28,33,300	17,61,61,200
4 - ditto - 1854 55	1,03,26,400	58,95,700	43,72,500	35,63,600	59,60,600	4,72,100	8,56,100	83,57,700	2,15,15,600	1,82,89,100	3,98,04,700	1,16,12,000	1,13,60,700	6,27,77,400
4 Per Cent. Transfer Loan of 1865	6 20,89,600	1,88,03,000	93,22,800	78,40,700	88,30,100	10,11,800	55,21,600	1,25,23,400	8,57,64,100	4,01,78,900	12,59,43,000	3,40,64,396	1,93,39,400	17,93,46,796
4 - ditto - Mysore Family Loan*	- -	17,64,164	- -	- -	- -	- -	- -	- -	- -	17,64,164	17,64,164	- -	- -	17,64,164
3½ Per Cent. Loan of 1858 54	31,300	56,000	21,600	- -	12,700	1,500	4,100	1,03,600	69,700	1,61,100	2,30,800	3,65,600	55,600	6,52,000
5½ - ditto - - 1859–60													1,30,76,900	2,00,16,807
Transfer Loan of 1879, 4½ per cent. Portion	1,29,68,600	30,34,900	51,98,000	60,67,200	52,01,000	16,06,400	7,62,400	16,41,200	2,41,30,000	1,23,49,700	3,64,79,700	2,01,25,900	3,97,86,400	8,92,59,393
Transfer Loan of 1879, Seven Shillings Sterling Per Cent. Portion													51,500	2,44,200
4 Per Cent. Stock Receipts of 1853–54	1,44,413	- -	- -	- -	42,174	- -	- -	- -	1,86,587	- -	1,86,587	1,37,344	1,19,82,734	1,23,06,665
Treasury Notes	84,05,014	- -	- -	- -	- -	- -	- -	56,000	84,05,014	56,000	84,61,014	2,81,700	- -	87,42,714
4½ Per Cent. Loan of 1870	46,63,100	14,25,700	13,62,200	7,39,000	21,72,100	2,25,400	16,66,900	8,79,700	98,64,300	32,69,800	1,31,34,100	12,90,000	39,33,800	1,83,57,900
4½ - ditto - - 1871	12,77,500	61,500	1,63,000	70,000	1,60,000	6,000	19,500	1,10,500	16,20,000	2,48,000	18,68,000	15,000	3,36,000	22,19,000
4½ - ditto - - 1872	2,65,23,900	66,89,100	1,42,97,700	1,03,67,300	60,66,000	16,97,700	22,20,300	77,72,200	4,91,07,900	2,65,26,300	7,56,34,200	1,76,89,100	3,05,98,000	12,39,21,300
4½ - ditto - - 1878	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	1,98,84,500	50,92,000	2,49,76,500
5 Per Cent. Debenture Loan of 1867, repayable in June 1882.	11,40,000	1,32,000	3,39,000	4,000	3,04,000	22,000	67,000	70,000	18,50,000	2,28,000	20,78,000	6,14,000	33,11,000	60,03,000
5 Per Cent. Debenture Loan of 1877†	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	38,000	- -	38,000
6 Per Cent. Public Works Loan of 1854–55.†	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	59,500	- -	59,700
5 Per Cent. Loan of 1856-57†	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	71,300	79,800	1,51,100
TOTAL - - - *Rs.*	‡ 19,33,02,479	6,11,00,177	4,66,33,198	3,68,13,927	4,09,64,816	68,54,525	1,59,53,420	4,40,62,199	§ 29,68,53,913	14,88,30,828	44,56,84,741	‖ 15,64,76,705	16,64,43,839	76,86,05,285

* Part has been transferred to the 4 per Cent. Loan of 1865.

† Loans under discharge.

‡ This sum includes the Paper Currency Reserve.

§ The above proportion of Notes actually presented for Interest, if applied to the balance of Notes not presented, shows the relative proportion of Europeans and Natives to be - - -

REPORT

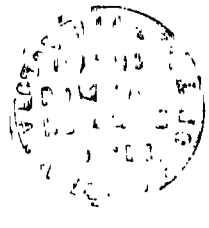
FROM THE

SELECT COMMITTEE

ON

EAST INDIA (PUBLIC WORKS);

TOGETHER WITH THE



PROCEEDINGS OF THE COMMITTEE,

MINUTES OF EVIDENCE,

AND APPENDIX.

Ordered, by The House of Commons, *to be Printed,*
1 *August* 1878.

Ordered,—[*Tuesday*, 22*nd January* 1878]:—THAT a Select Committee be appointed to inquire into and report as to the expediency of constructing Public Works in India with money raised on loan, both as regards financial results and the prevention of famine.

Ordered,—[*Monday*, 18*th February* 1878]:—THAT the Committee do consist of—

Mr. Balfour.	Sir Joseph M'Kenna.
Mr. Fawcett.	Mr. Sampson Lloyd.
Mr. Childers.	Mr. Grant Duff.
Mr. Ashbury.	Mr. Mulholland.
Sir George Campbell.	Mr. Eustace Smith.
Mr. Onslow.	Mr. Agnew.
Mr. John Cross.	Lord George Hamilton.
Mr. Hardcastle.	

THAT the Committee have power to send for Persons, Papers, and Records.

THAT Five be the Quorum of the Committee.

Ordered,—[*Tuesday*, 7*th May* 1878]:—THAT Lord George Hamilton be re-appointed a Member of the Committee.

Ordered,—[*Thursday*, 9*th May* 1878]:—THAT the Committee do consist of Seventeen Members.

THAT Mr. Edward Stanhope and Mr. Pease be added to the Committee.

Ordered,—[*Tuesday*, 14*th May* 1878]:—THAT Mr. Eustace Smith be discharged from further attendance on the Committee.

THAT Mr. Ernest Noel be added to the Committee.

REPORT - - - - - - - - - - - - p. iii
PROCEEDINGS OF THE COMMITTEE - - - - - p. iv
MINUTES OF EVIDENCE - - - - - - - p. 1
APPENDIX - - - - - - - - - - - p. 329

REPORT.

THE SELECT COMMITTEE appointed to inquire into and report as to the expediency of constructing PUBLIC WORKS in *India* with money raised on loan, both as regards financial results and the prevention of famine;——HAVE agreed to the following REPORT:—

YOUR COMMITTEE have examined Witnesses upon the subject referred to them; but as it will not be in their power to conclude their investigation in the present Session they have agreed to Report to the House the Evidence which they have taken, together with an Appendix, and they recommend that the Committee be re-appointed in the next Session of Parliament.

1 *August* 1878.

PROCEEDINGS OF THE COMMITTEE.

Friday, 22nd February 1878.

MEMBERS PRESENT:

Mr. Sampson Lloyd.	Mr. Balfour.
Mr. Agnew.	Sir Joseph M'Kenna.
Mr. John Cross.	Lord George Hamilton.
Mr. Eustace Smith.	Mr. Fawcett.
Mr. Childers.	Sir George Campbell.
Mr. Ashbury.	Mr. Mulholland.

Lord GEORGE HAMILTON was called to the Chair.

The Committee deliberated.

[Adjourned till Thursday next, at a Quarter-past Twelve o'clock.

Thursday, 7th March 1878.

MEMBERS PRESENT:

Mr. Childers.	Mr. Fawcett.
Mr. Agnew.	Mr. Grant Duff.
Mr. Ashbury.	Mr. Sampson Lloyd.
Mr. John Cross.	Sir George Campbell.
Sir Joseph M'Kenna.	Mr. Balfour.
Mr. Onslow.	Mr. Hardcastle.
Mr. Mulholland.	

In the absence of the Chairman, Mr. CHILDERS took the Chair.

Major General *C. H. Dickens* was examined.

[Adjourned till Thursday next, at a Quarter-past Twelve o'clock.

Thursday, 14th March 1878.

MEMBERS PRESENT

Mr. CHILDERS in the Chair.

Mr. Sampson Lloyd.	Mr. Ashbury.
Sir George Campbell.	Mr. Onslow.
Mr. John Cross.	Mr. Balfour.
Mr. Fawcett.	Mr. Hardcastle.
Mr. Agnew.	

Major General *C. H. Dickens* was further examined.

[Adjourned till Thursday next, at a Quarter-past Twelve o'clock.

Thursday, 21st March 1878.

MEMBERS PRESENT:

Lord GEORGE HAMILTON in the Chair.

Mr. Agnew.	Mr. Grant Duff.
Mr. Childers.	Mr. Balfour.
Mr. John Cross.	Mr. Hardcastle.
Sir George Campbell.	Mr. Fawcett.
Mr. Sampson Lloyd.	Mr. Mulholland.
Mr. Onslow.	

Major General *C. H. Dickens* was further examined.

[Adjourned till Thursday next, at a Quarter-past Twelve o'clock.

Thursday, 28th March 1878.

MEMBERS PRESENT:

Mr. CHILDERS in the Chair.

Mr. Fawcett.	Mr. Ashbury.
Mr. Agnew.	Mr. Hardcastle.
Sir George Campbell.	Mr. Balfour.
Mr. John Cross.	Mr. Mulholland.
Mr. Onslow.	

Major General *C. H. Dickens* was further examined.

Sir *George Campbell* (a Member of the Committee) was examined.

[Adjourned till Thursday next, at a Quarter-past Twelve o'clock.

Thursday, 4th April 1878.

MEMBERS PRESENT:

Mr. CHILDERS in the Chair.

Mr. Agnew.	Mr. Balfour.
Mr. Grant Duff.	Mr. John Cross.
Mr. Sampson Lloyd.	Mr. Fawcett.
Sir George Campbell.	Mr. Onslow.
Mr. Hardcastle.	Mr. Mulholland.

The Earl of *Northbrook* (attending by permission of the House of Lords) was examined.

[Adjourned till Thursday, 9th May, at a Quarter-past Twelve o'clock.

Thursday, 9th May 1878.

MEMBERS PRESENT:

Lord GEORGE HAMILTON in the Chair.

Mr. Childers.	Sir George Campbell.
Mr. Sampson Lloyd.	Mr. Fawcett.
Mr. Agnew.	Mr. Balfour.
Mr. Onslow.	Mr. John Cross.

Colonel *James Crofton* was examined.

[Adjourned till Thursday next, at a Quarter-past Twelve o'clock.

Thursday, 16th May 1878.

MEMBERS PRESENT:

Lord GEORGE HAMILTON in the Chair.

Mr. Childers.	Mr. Onslow.
Mr. Ashbury.	Mr. John Cross.
Mr. Edward Stanhope.	Mr. Fawcett.
Mr. Agnew.	Mr. Grant Duff.
Mr. Sampson Lloyd.	Mr. Hardcastle.
Sir Joseph M'Kenna.	Mr. Pease.

Sir *George Campbell* (a Member of the Committee) was further examined.

[Adjourned till Thursday next, at a Quarter-past Twelve o'clock.

Thursday, 23rd May 1878.

MEMBERS PRESENT:

Lord GEORGE HAMILTON in the Chair.

Sir George Campbell.	Mr. Childers.
Mr. Sampson Lloyd.	Mr. Balfour.
Mr. John Cross.	Mr. Hardcastle.
Mr. Ernest Noel.	Mr. Pease.
Mr. Agnew.	Mr. Edward Stanhope.
Mr. Fawcett.	Sir Joseph M'Kenna.
Mr. Ashbury.	

Sir *George Campbell* (a Member of the Committee) was further examined.

[Adjourned till Thursday next, at a Quarter-past Two o'clock.

Thursday, 30*th May* 1878.

MEMBERS PRESENT:

Lord GEORGE HAMILTON in the Chair.

Mr. John Cross.	Mr. Agnew.
Mr. Sampson Lloyd.	Mr. Hardcastle.
Mr. Onslow.	Mr. Balfour.
Mr. Fawcett.	Mr. Pease.
Mr. Childers.	Mr. Grant Duff.
Sir George Campbell.	

Colonel *James Fife* was examined.

[Adjourned till To-morrow, at Half-past Two o'clock.

Friday, 31*st May* 1878.

MEMBERS PRESENT:

Sir GEORGE CAMPBELL in the Chair.

Sir Joseph M'Kenna.	Mr. John Cross.
Mr. Onslow.	Mr. Fawcett.
Mr. Hardcastle.	Mr. Pease.

Colonel *James Fife* was further examined.

[Adjourned till Thursday next, at a Quarter-past Twelve o'clock.

Thursday, 6*th June* 1878.

MEMBERS PRESENT:

Lord GEORGE HAMILTON in the Chair.

Mr. Ernest Noel.	Mr. Ashbury.
Mr. Fawcett.	Mr. Hardcastle.
Mr. John Cross.	Mr. Mulholland.
Mr. Sampson Lloyd.	Sir George Campbell.
Mr. Balfour.	

Sir *George Campbell* (a Member of the Committee) was further examined.

[Adjourned till Thursday, 20th June, at Twelve o'clock.

Thursday, 20*th June* 1878.

MEMBERS PRESENT:

Lord GEORGE HAMILTON in the Chair.

Mr. Mulholland.	Mr. Onslow.
Mr. Sampson Lloyd.	Sir George Campbell.
Mr. John Cross.	Mr. Agnew.
Mr. Edward Stanhope.	Mr. Hardcastle.

Lieutenant General Sir *Arthur Cotton* was examined.

[Adjourned till Thursday next, at Twelve o'clock.

Thursday, 27th June 1878.

MEMBERS PRESENT:

Lord GEORGE HAMILTON in the Chair.

Mr. Agnew.	Mr. Fawcett.
Sir George Campbell.	Mr. Sampson Lloyd.
Mr. Onslow.	Mr. Hardcastle.
Mr. Ashbury.	Mr. Childers.
Mr. Edward Stanhope.	Mr. John Cross.
Mr. Ernest Noel.	Mr. Pease.

Lieutenant General Sir *Arthur Cotton* was further examined.

Sir *William Muir* was examined.

[Adjourned till Thursday next, at a Quarter-past Twelve o'clock.

Thursday, 4th July 1878.

MEMBERS PRESENT:

Lord GEORGE HAMILTON in the Chair.

Mr. Ernest Noel.	Mr. John Cross.
Mr. Onslow.	Mr. Hardcastle.
Mr. Agnew.	Mr. Edward Stanhope.
Mr. Fawcett.	Mr. Childers.

Sir *William Muir* and Lieutenant General Sir *Arthur Cotton* were further examined.

[Adjourned till Thursday next, at a Quarter-past Twelve o'clock.

Thursday, 11th July 1878.

MEMBERS PRESENT:

Lord GEORGE HAMILTON in the Chair.

Mr. Fawcett.	Mr. Sampson Lloyd.
Sir Joseph M'Kenna.	Mr. Hardcastle.
Mr. Onslow.	Mr. Childers.
Sir George Campbell.	Mr. Earnest Noel.
Mr. Grant Duff.	Mr. Edward Stanhope.
Mr. Agnew.	Mr. John Cross.

The Lord *Napier and Ettrick* (attending by permission of the House of Lords) was examined.

[Adjourned till Thursday next, at a Quarter-past Twelve o'clock.

Thursday, 18*th July* 1878.

MEMBERS PRESENT:

Lord GEORGE HAMILTON in the Chair.

Mr. Onslow.	Sir Joseph M'Kenna.
Mr. John Cross.	Mr. Ernest Noel.
Mr. Fawcett.	Mr. Ashbury.
Sir George Campbell.	Mr. Pease.
Mr. Hardcastle.	Mr. Agnew.

Colonel *G. Chesney* was examined.

[Adjourned till Thursday next, at a Quarter-past Twelve o'clock.

Thursday, 25*th July* 1878.

MEMBERS PRESENT:

Sir GEORGE CAMPBELL in the Chair.

Mr. Agnew.	Mr. Hardcastle.
Mr. John Cross.	Mr. Balfour.
Mr. Sampson Lloyd.	Sir Joseph M'Kenna.
Mr. Ashbury.	Lord George Hamilton.
Mr. Childers.	Mr. Grant Duff.
Mr. Onslow.	Mr. Fawcett.

Colonel *J. F. Fischer*, R.E., and Mr. *A. M. Rendel* were severally examined.

[Adjourned till Thursday next, at a Quarter-past Twelve o'clock.

Thursday, 1*st August* 1878.

MEMBERS PRESENT:

Lord GEORGE HAMILTON in the Chair.

Mr. Fawcett.	Mr. John Cross.
Mr. Agnew.	Sir Joseph M'Kenna.
Mr. Sampson Lloyd.	Mr. Grant Duff.
Mr. Onslow.	Mr. Ashbury.
Mr. Childers.	

Mr. *J. Danvers* was examined.

Report read, and *agreed to.*

Ordered, To Report, together with the Minutes of Evidence, and an Appendix.

LIST OF WITNESSES.

Thursday, 7th March 1878.

PAGE

Major General C. H. Dickens, C.S.I. - 1

Thursday, 14th March 1878.

Major General C. H. Dickens, C.S.I. - 16

Thursday, 21st March 1878.

Major General C. H. Dickens, C.S.I. - 35

Thursday, 28th March 1878.

Major General C. H. Dickens, C.S.I. - 55
Sir George Campbell, M.P., K.C.S.I. - 61

Thursday, 4th April 1878.

Right Honourable The Earl of Northbrook - - - - - - - 73

Thursday, 9th May 1878.

Colonel James Crofton, R.E. - - 93

Thursday, 16th May 1878.

Sir George Campbell, M.P., K.C.S.I. - 112

Thursday, 23rd May 1878.

Sir George Campbell, M.P., K.C.S.I. - 133

Thursday, 30th May 1878.

Colonel James Fife - - - - 155

Friday, 31st May 1878.

Colonel James Fife - - - - 163

Thursday, 6th June 1878.

PAGE

Sir George Campbell, M.P., K.C.S.I. - 172

Thursday, 20th June 1878.

Lieutenant General Sir Arthur Cotton, K.C.S.I. - - - - - 183

Thursday, 27th June 1878.

Lieutenant General Sir Arthur Cotton, K.C.S.I. - - - - - 206
Sir William Muir, K.C.S.I. - - 222

Thursday, 4th July 1878.

Sir William Muir, K.C.S.I. - - 228
Lieutenant General Sir Arthur Cotton, R.E., K.C.S.I. - - - - 244

Thursday, 11th July 1878.

Right Honourable Lord Napier and Ettrick - - - - - 250

Thursday, 18th July 1878.

Colonel George Chesney, R.E. - - 269

Thursday, 25th July 1878.

Colonel John Frederick Fischer, R.E. - 295
Mr. Alexander Meadows Rendel - 309

Thursday, 1st August 1878.

Mr. Juland Danvers - - - - 320

MINUTES OF EVIDENCE.

Thursday, 7th March 1878.

MEMBERS PRESENT:

Mr. Agnew.
Mr. Ashbury.
Mr. Balfour.
Sir George Campbell.
Mr. Childers.
Mr. John Cross.
Mr. Grant Duff.
Mr. Fawcett.
Mr. Hardcastle.
Mr. Sampson Lloyd.
Sir Joseph M'Kenna.
Mr. Mulholland.
Mr. Onslow.

THE RIGHT HONOURABLE HUGH C. E. CHILDERS, IN THE CHAIR.

Major General C. H. DICKENS, C.S.I., called in; and Examined.

Major Gen. *Dickens*, C.S.I.

7 March 1878.

Chairman.

1. WILL you be good enough to state to the Committee what your office has been?—I have been Secretary to the Government of India in the Public Works Department. I first acted in that capacity in 1860-61, under Lord Canning. I was permanently appointed to the office in 1865, under Lord Lawrence, and I have held it ever since, until February 1877, when I resigned and came home.

2. Whom did you succeed? — I succeeded General Strachey, who is now temporarily in India. He is a member of the India Council now on duty in India.

3. You have retired from the office now, have you not?—Yes, I have resigned the office.

4. But you are able to give the Committee information up to last year, as to the whole of the Public Works policy of the Government of India?—Yes.

5. Will you commence by stating what works, or what classes of works, have hitherto been constructed with borrowed money by the Indian Government?—Only irrigation works and railways. I cannot say that they have been altogether constructed by borrowed money, because the understanding on which they were undertaken was, that if money was available from the general resources of the country, it was to be made use of, and borrowing was only to be resorted to in case of need.

6. Would you expand that answer a little, taking the railways first; would you explain in general terms to what extent railways have been constructed with borrowed money?—I think the railways have been entirely constructed with borrowed money, except a small portion of the expenditure.

7. That is to say, excepting that expenditure which was borne by revenue directly?—Yes.

Chairman—continued.

8. What has been the past railway policy of the Government?—Up to 1870 all the railways were constructed by companies, and, I may say practically, all under guarantee. In various times, from perhaps 1867 downwards, the Government have been more or less dissatisfied with the guarantee system, and after a good deal of consideration and correspondence with the Secretary of State, it was resolved that they should be undertaken by the Government itself, without the intervention of companies, and that policy has been carried out since 1870.

9. Has there been any exception to the rule that since 1870 they should be constructed with borrowed money exclusively?—No, the only exception has been this, that sometimes the examination and the preliminary operations have been undertaken from the revenues of the State before the Government determined whether it would continue the operations or undertake the actual construction of the works.

10. But the theory has been that from that time the whole of the railway expenditure should be capital expenditure charged upon borrowed money?—I should say rather that it was charged to what was technically called the head "extraordinary," which was understood would be supplied from borrowed money if necessary, but from any surplus revenue if it was available.

11. Passing for the moment from railway to irrigation works, would you explain to what extent or with what exception they have been constructed with borrowed money, and what are the exceptions? — The irrigation works were commenced by the Government very long before there was any thought of borrowing money for public

108674

Major Gen. *Dickens*, C.S.I.

7 March 1878.

Chairman—continued.

public works. I believe that the first commencement of undertakings of that kind on a large scale dates from about 1821, and gradually the operations were enlarged until the Ganges canal was open for irrigation, about 1854. In 1854, the Government incurred a loan for public works, but I think that the money was not spent for public works altogether, although it was called a Public Works Loan; but the decision to borrow for irrigation works, and to proceed with the works on a large scale, was come to by the Secretary of State in 1867, and from that time that has been the policy.

12. From 1867, then, we may take it that practically irrigation works have been exclusively constructed with borrowed money?—Yes; but with the reservation that the technical sanction was to charge them to the head "extraordinary," and the extraordinary head was one which was to be supplied with borrowed money, if necessary, but to be met from the resources of the State, if possible.

13. Practically, from 1867, dates the exclusive construction, with that reservation, of irrigation works; and the exclusive construction of railways, with your one reservation, dates from 1870?—Yes. Perhaps I had better mention that there were two irrigation companies which were formed before the resolution to undertake irrigation works from borrowed money, the Madras Irrigation Company and the East India Irrigation Company. The works of the East India Irrigation Company were purchased by the Government, if I remember rightly, in 1867, but the works of the Madras Irrigation Company still remains in the hands of the company, which has been assisted by the Government, I think, to the extent of some 600,000 *l.*

14. Is that a company which receives a guarantee from the Government also?—Yes. The East India Irrigation Company do not receive a guarantee.

15. Are there any other great public works in India which have been constructed with borrowed money?—I think the harbour works of Madras and the docks of Bombay are being so constructed; but they have not been undertaken in the same sense with borrowed money, because they have not been constructed as Imperial works. The Bombay works are being constructed on the responsibility of a local Port Trust, and in Madras the Imperial Government has advanced the money in the first instance on the understanding that a similar Trust would there be formed for the carrying out of the works, and that the interest would be met by dues to be levied under an Act which was to be passed for the purpose.

16. By the Imperial Government, do you mean the Government of India?—Yes. We distinguish the Imperial from the local governments in that way.

17. That was the case at Madras; was the arrangement a similar arrangement at Bombay?—Yes.

18. Are those the only harbour works to which borrowed money has been applied?—Yes, I think so.

19. Has there been any rule of policy laid down in dealing with harbour works by the Public Works Department or by the Government of India?—I think they have generally been constructed as local works as far as I remember. There are also works for the Port Trust in Calcutta, which were constructed much in a similar manner, and the money which was advanced to the Port Trust by the Government of India. These may perhaps be considered as having been taken from borrowed money, because, as I explained before, as far as we are concerned in the Public Works Department, the only condition was that the expenditure was charged to the Head Extraordinary, and in the Financial Department arrangements were made for supplying the funds, so that we can hardly tell whether the money was really borrowed for the purpose, or whether it was supplied in each individual case by the resources of the State.

20. But as a matter of fact, do you suppose that it became necessary to borrow for the Calcutta works as much as for the other two, or were they really borne out of the year's income?—I think out of the year's income practically; but there is this to be said, that the Government of India has always during all this time been more or less in debt, and if it had not undertaken these works, the debt might have been paid off, so that it does not make any real difference financially.

21. Passing from harbours, are there any other public works which would come in the same category?—Not that I can think of at the moment.

22. Is it not the case that, to some extent, barracks have been constructed, for which it was necessary to borrow money?—I think at one time a resolution was formed to construct them irrespective of the balance of income, if necessary, from borrowed money, but I believe that was stopped by the Secretary of State before any money actually was borrowed for the purpose.

23. Is there any other instance in which it has been the declared policy of the Government of India to construct works from borrowed money, that is to say, not exclusively from the annual revenue?—No.

24. Then so far as the past is concerned, the inquiries of this Committee in your view may be limited to railways, irrigation works, and to some extent to harbours, and, in a very inchoate form, to barracks?—I think they may be said to be limited entirely to irrigation and railways.

25. Has the question never been discussed, or at least ever reached the point of a policy being adopted by the Government, of constructing any other works with borrowed money?—No.

26. May we say that there are, as far as you are aware, no other public works that would enter into this question?—I think so.

27. Will you now be good enough to inform the Committee of the history of the Public Works Department, and the manner in which those great works have been supervised in time past. When was the Public Works Department formed?—I think in 1854-5. Before that time the public works of all descriptions were carried on by what may be said to be the Engineer Department of the Army. There were three Military Boards in the three Presidencies, and under them all the Engineers were employed. In particular cases the Engineers were lent to the Civil Departments, or the works were undertaken for the Civil Department by the Military Board with its establishment of Engineers. In 1854 Lord Dalhousie first formed the Public Works Department for the Bengal Presidency by abolishing

Chairman—continued.

abolishing the Military Board, and placing Chief Engineers under each of the Lieutenant Governors and minor administrations; and in 1855 the same measure was carried out for Madras and Bombay, and a Public Works Secretariat was formed for the Government of India. In this re-organisation of Lord Dalhousie the process was exactly reversed as regards military and civil. All the works, both civil and military, were placed under the civil governments, and those required for the army were constructed for the Military Department, so that the whole was a Civil Department under one management.

28. Before 1854 in each of the Presidencies the construction of great public works was practically intrusted to a Military Department?—Yes.

29. Was that department under supreme military control, or under the Finance Minister or Finance Department?—I think it acted under the department of the Government of India for which it was working. If there were civil works, such as irrigation, for instance, that would have come under the Lieutenant Governor or under the Home Department, and military works went to the Military Department, and so forth.

30. Was the description of the department (previously to the change) purely military?—It was like a Civil Department of the Army.

31. You state the change as dating from 1854-5; what had been before that the principal works which had been in this way supervised by the Military Board?—The Eastern and Western Jumna Canals in Northern India, and the Ganges Canal.

32. Had the entire construction and management of those canals been under the Military Board?—It was under the Military Board partly, and partly under the Lieutenant Governor of the North West Provinces, because the Military Board corresponded with the Lieutenant Governor, and carried out his orders in the matter.

33. In 1854 and 1855, when first in Bengal and afterwards in the other Presidencies, the Public Works Departments were formed, was the whole of the responsibility of the Public Works, whether civil or military, taken off the Military Department and concentrated in the New Public Works Department?—Yes.

34. And a secretary to the Government of India for Public Works purposes was appointed?—Yes.

35. Was that business connected with any particular member of the Council, or how was it managed?—Latterly it has been so. At first all the business went to the Governor General and to the other members of the Council in turn, but as the work increased it was gradually separated, each member of the Council taking his own department, and in that way the member of the Council in charge of the Public Works Department ultimately transacted any ordinary business of the department without its going to the Governor General; only the important cases went to the Governor General.

36. Then a civil member of the Council had assigned to him the duty of practically taking the business from the secretary of the Public Works Department?—Yes.

37. How long did that last?—It lasted until quite recently, when Sir Andrew Clark was the first member of the Council who was appointed to the Public Works Department; that was in 1875, I think.

Chairman—continued.

38. That was after the Act was passed appointing an additional civil member of the Council, was it not?—Yes.

Mr. *Onslow*.

39. I do not think you are quite accurate; Lord Mayo undertook the public works himself as Viceroy?—As one of the members of the Council. Sometimes the Viceroy has undertaken it himself.

Chairman.

40. Would you wish to correct your last answer with regard to what took place when Lord Mayo was Governor General?—Yes; I should mention, as an exception, that Lord Mayo preferred to take the Public Works Department himself, and not to entrust it to one of the members of the Council.

41. When Lord Northbrook succeeded him did it revert to a member of the Council?—Lord Northbrook kept it for a few months, but then transferred it to one of the members of the Council.

42. Had the Finance Department, through this member of the Council, any special connection at any time with the Public Works Department?—No, only in all large financial matters of course there was communication between the two departments. All provision of the funds, and so forth, was sanctioned by the Financial Department before anything was done.

43. In the same way, I presume, as any other department?—Yes.

44. Would you explain to the Committee what is the exact state of things now or what it was when you left India; what was the exact organisation of the department?—There was one change made by Lord Mayo, by which the military works were, to some extent, taken out of the hands of the civil governments, and placed under a special department, called the Military Works Branch. The department of Public Works was then divided into the Military Works Branch, the Civil Buildings and Roads Branch, the Irrigation Branch, and the Railway Branch. The Civil Buildings and Roads became a very small department, because Lord Mayo also transferred the whole responsibility, with an assignment of funds, to the control of the local governments in 1870 or 1871, giving them the complete financial control, with a certain grant of funds for the purpose; so that that part of the Public Works of India remains entirely under the local governments, and came up to the Government of India only in a general way for review.

45. Is that the present state of things, with the exception that there is a Minister of Public Works in the Governor General's Council?—Yes; and I understand that since I left the Irrigation has been, to some extent, transferred to the local governments, in the same way that the Civil Buildings and Road Works have been.

46. Will you be good enough to explain exactly the relative responsibility and the relation of the Central Public Works Department and the Presidency Public Works Departments under that arrangement?—The local governments of Madras and Bombay have certain powers of sanctioning works entrusted to them, by which they could, without reference to the Government of India, sanction works costing up

Major Gen. *Dickens*, C.S.I.

7 March 1878.

Major Gen. *Dickens*, C.S.I.

7 March 1878.

Chairman—continued.

to 20,000*l.* The lieutenant governorships of Bengal, the North Western Provinces, and the Punjab had powers up to 5,000*l.*, which were subsequently increased.

47. With respect to those works, has the Central Government any information, or is the matter left to local governments?—It only has information sent up in the annual budgets for expenditure on public works.

48. Does it check or retain the power to veto works, even below that amount?—Yes, it does; but it is very seldom exercised.

49. But the department itself has no knowledge in detail of those works as they are going on?—No, except in the periodical reports.

50. The responsibility for executing them is left, is it not, entirely to the Local Public Works Departments?—Yes.

51. With respect to works of larger amounts, what is the relation between the two?—The projects are sent up by the Local Public Works Department to the Public Works Department of the Government of India, and there they are examined, and any necessary inquiries are made, and the projects are either approved or rejected, as the case may be. Those again of which the cost is above 100,000 *l.*, have to be sent home to the Secretary of State for sanction, before they can be carried out in India by any authority.

52. In local works of that kind is the charge upon what are technically called local funds, or is the charge general upon the revenues of India?—The charge is general. With reference to the works which are constructed from the provincial funds, there is no limit, except the Secretary of State requires to be informed of works costing over 100,000 *l.*, otherwise the local government can carry them out from its own provincial funds, without further sanction.

53. So that the limits to 20,000 *l.* or 10,000 *l.* only relate to works which fall as a matter of charge upon the revenue of India?—Yes.

54. Is there still a limit of 5,000 *l.*?—No, it was 20,000 *l.* and 10,000 *l.*, and the small local governments, for instance, the Chief Commissioner of Oudh, and the Chief Commissioner of the Central Provinces, had no more than 2,000 *l.* In regard to works classed as extraordinary, the arrangements were stricter. The local governments had no authority to sanction anything to that charge without the sanction of the Government of India.

55. Do you mean works falling upon borrowed money?—Which might fall upon borrowed money.

56. The only works, then, which the local governments have authority to deal with, are those which fall on the revenue in the year?—Yes.

57. Therefore, with respect to the special inquiry by this Committee, which is into the works constructed out of borrowed money, the local governments have at present no power at all?—No; at least they had not when I left India. I do not quite know what changes have been made since.

58. Will you be good enough to explain to the Committee the circumstances which led to the change of policy about railways and the construction of railways by the State itself, and in doing so, perhaps you will briefly state what the guarantee policy was?—When Lord Dalhousie first inaugurated the construction of railways in India, he proposed a form of guaranteed companies, in which the companies were to receive a guarantee of 5 per cent. on the capital raised by them for the construction of railways, their operations being under the control of the Government to a certain extent.

Chairman—continued.

59. They were to be companies formed in England, were they not, and borrowing their money in England?—Yes; they were formed in England, and all the capital was raised in England; very little of it was raised in India.

60. What was the extent of the control of Government?—The Government required to sanction every expenditure through its proper officer before it was undertaken; but practically the companies had a great deal in their own power, and it was believed that the form of the guarantee by which the companies received interest, in proportion to the amount which they spent, was not conducive to economy either in the construction or the working of the railways.

61. The original arrangement was then that the capital was raised by the companies themselves, under a guarantee in the first instance of 5 per cent.

62. And that the routes should be fixed by the Government?—Yes, the routes were to be fixed by the Government; the whole of the work required the sanction of the Government, and the interest was payable to the companies as soon as the money was raised, without reference to the money being spent or not spent.

63. Was India mapped out under that plan so far as the prospective railway accommodation was concerned?—Lord Dalhousie commenced three lines, which were considered experimental railways; a short line in Madras, in Bombay, and in Bengal, and they were extended gradually, as the Government of India proposed to the Secretary of State, and obtained his sanction, and the result was the construction of the great lines from Madras to Beypoor, from Madras to Bellary. From Bombay, up the Ghat, I think the line was first constructed to Poonah and up to Jubbulpore, from Calcutta; the first line was from Calcutta to Birdwan, and then to Raneegunge. It was then constructed from Allahabad to Cawnpore, and finally all the way up the valley of the Ganges to Delhi. A branch was brought from Allahabad to Jubbulpore, and was afterwards united with the Bombay line, and so connected with Bombay. I think, in 1870, the line was opened right through from Bombay to Calcutta, and the junction between Bombay and Madras was only completed, I think, in 1874. There was also a line undertaken from Kurrachee to Kotree, opposite Hydrabad, and operations were extended gradually to Oudh, and the line east of Bengal, and in that way the main trunk lines were carried out.

64. Were those lines carried out under any distinct policy of connecting the different parts of the country together, laid down at any particular time by any particular Governor General, or have they been filled up from time to time as proposals have been made?—They have been filled up from time to time, but Lord Dalhousie's policy looked forward to having main lines across the country. There were many questions raised as to the particular routes to be followed.

65. Could you give us historically the dates at which one part of the system was approved, and then another part of the system was approved?

Chairman—continued.

proved?—No, I could not do that without refreshing my memory; but in 1869 Lord Lawrence reviewed the whole policy, and drew out a system which has since been acted upon more or less.

66. That was on the eve of the Government system being adopted?—Yes.

67. But when the guarantee system was the only one which found favour in India, was there any period at which any one took up the question as a whole, and formed a scheme for the connection of the railway accommodation in India?—No; I do not think any such scheme was ever sanctioned after Lord Dalhousie's Minute, except in the sense of carrying out the intention which he sketched out.

68. Did Lord Dalhousie's Minute deal with the whole of India, and point to any particular lines of communication being completed?—I do not think it was very precisely done, but I should like to refresh my memory upon it.

69. In Bombay, for instance, did Lord Dalhousie sketch out either the Baroda line or the Great Indian Peninsula line?—Yes, I think he did; but I do not think it was sketched out in the detail in which it was ultimately carried out; it was only indicated.

70. Then until we were on the eve of parting from the guarantee system to the construction of railways directly by the Government, there never was a time when railway communication, as a whole, was treated as a policy to be worked up to?—Not in a definite way, certainly.

71. You are aware probably of the railway policy in France; for instance, for many years under which the first *réseau* of the railways was sketched out, and subsequently a second and a third; there never was any corresponding policy to that in India?—No; there was none generally accepted, certainly.

72. May we take it that the date of a comprehensive policy of that kind was when in 1869 Lord Lawrence's Minute was written, and the Duke of Argyll's Minute, which led to the present policy of constructing railways by the Government?—Yes; I think that was gradually worked up to, through a great many partial resolutions, but there was no general sketch that I know of till then.

73. You were going to give us the reasons which led to the change of policy, and the Indian Government resolving to construct in future all the railways themselves; would you explain this very fully in detail?—It was found that the guarantee of interest to the companies was not conducive to economy, either in the execution of the work or in the working, and the Government wished to introduce, for the future, contracts in a different form, which might give them more power of controlling the economy and the execution and working of the railways, and several schemes of that kind were prepared, but it was found that companies could not be got to work them, and it was then thought best that the Government should itself undertake the works and the working of the lines.

74. Then the entire change of policy was the result of an unsuccessful attempt in the first instance to modify the guarantee system?—Yes.

75. Under the guarantee system the railways had to refund to the Government the amount which they paid on account of interest to the extent of half their surplus profits, had they not?—Yes; the guarantee was generally for five per cent., and if the profits rose above that, one half went to the Government to repay the guarantee interest which had been paid to the companies, and the other half went to the company.

Chairman—continued.

Major Gen. *Dickens*, C.S.I.

7 March 1878.

76. Meanwhile the very large sums which the Goverment had paid on account of the guarantee carried no interest as against the company, did they?—Yes; there was a simple interest account, but that was practically of no use, because the accumulation of the guaranteed interest was so large that there was no chance of the companies paying it off.

77. It is the case then that you have kept up the simple interest charged against the companies on your advances, but not the compound interest?—No, not the compound interest.

78. Was that one of the reasons which led the Government to consider the arrangement to be very burdensome?—No, I do not think that that reason was thought to be of any importance practically.

79. Was the reason only economy in construction not being ensured?—Economy not being ensured, and the control being somewhat imperfect, the Government could not get the arrangements which it wished to have made on many occasions.

80. Do you mean control as to construction or control as to working?—Both.

81. Was the Government under the impression that they could have made more economical contracts for the works, for instance?—It was rather a desire that such contracts should be made, that the Government should be able to guarantee the estimate for the construction of the line, leaving the responsibility of working within that estimate to the company. That was one point which was raised.

82. And that you found impracticable?—Yes, no company would accept such terms.

83. Was it the impression of the Government that they could have themselves kept the expenditure within the anticipated bounds better than the companies?—Yes.

84. Do the circumstances of India give the Government the power to do it better than a private company?—Perhaps if it was the interest of the private company to do it, as it was the interest of the Government, the private company might have been able to do it, but by the form of the guarantee it was not the interest of the company to do it. The interest of the company was, of course, to have a large capital expenditure, and as large a guarantee of interest upon it as possible.

85. It was the view of the Government that the companies were practically under no restraint to economise?—I should put it rather in this way, that the companies had no great inducement to be economical.

86. Do you refer specially to construction?—Both to construction and working until the profits of the railways rose to be near the five per cent., and then of course the companies have a very great inducement to work economically.

87. The principal companies, I think, are now paying more than five per cent.?—Yes; the principal companies are working very economically; for instance, the East Indian.

88. And now that economical working has

Major Gen. *Dickens*, C.S.I.

7 March 1878.

Chairman—continued.

arrived?—Yes; but it was a long time before it occurred.

89. Might I put it this way, that with respect to the railways which were not likely to pay more than five per cent. the inducements to economy were not to be expected to exist, whereas with respect to those which were likely to pay more than five per cent. the inducement would exist?—Quite so.

90. Was it then the view of the Government that the future railways would be less likely to be remunerative than the former railways?—I think the Government did not anticipate at that time the great growth of traffic which has taken place. The railways remained a long time without paying more than their guaranteed interest, and it was thought that on the whole they were not likely to pay more unless they were constructed in a very much more economical manner.

91. If the Government had foreseen or had estimated that the companies would have paid so much better than they were paying in 1870, that argument would have had less weight?—Certainly; but no doubt the railways which remain to be constructed are not railways which will have so much traffic as those main lines which already are constructed.

92. Would you distinguish as to those railways; some of them, I presume, are commercial and some are not; has not that distinction been drawn?—Yes.

93. Will you explain that to the Committee?—Yes; there is especially the Indus Valley Railway, which is a line connecting the Kurrachee and Kotree lines with the Punjab. One of the guaranteed railways have constructed a line from Delhi to Mooltan, and the Indus Valley Line joins Mooltan with Kotree; it runs through a very poor country, and is not considered likely to pay commercially, but it is a very important line in a military point of view; that is one which has been deliberately undertaken knowing that it is not likely to pay as a commercial concern.

94. Are there any other lines which have been so constructed with the almost certain knowledge that they could not be remunerative?—There is also the line from Lahore towards Peshawur, which is through a rather less poor country; but the works are very expensive crossing the large rivers in the Punjab, and that is not likely to pay, but it is of great military importance, and has been undertaken in the same way. These are the only two lines which are within that category.

95. Are there any other lines which do not come within that category which may be treated as commercial lines, but which the Government is now constructing?—I think all the other lines may be treated as commercial ones.

96. For instance, you showed us those which were being constructed under the guarantee system; will you now show us those which you refer to?—First, the Bombay and Baroda Company constructed a line from Bombay northward to Ahmedabad; the East Indian line goes to Agra and Delhi. We have now partly constructed, and have partly under construction, lines joining Agra and Delhi, *viâ* Ajmeer to Ahmedabad, and also from Ajmeer again to Indore, to join the Great Indian Peninsula below the Ghâts. That line is constructed upon the narrow gauge, and very cheaply, and the part which is already in working has begun to pay, and has paid five per cent.

Chairman—continued.

97. May those lines which you have now pointed out to the Committee be considered as lines constructed for commercial purposes, and with a view to paying?—Both for commercial and military purposes. We have also a line which has lately been opened from Rangoon and Prome, and another from the Ganges to near Darjeeling; and we have another which was commenced during the famine of 1873-74 in Tirhoot.

98. Those are the principal lines or all the lines which are now being constructed, or which have been constructed by the Government of India themselves?—Yes.

99. Have the contracts with the companies, so far as construction is concerned, run out, or have they any further powers?—There will still be a good deal of construction required in minor matters and improvements, you may say, upon the guaranteed lines, which will have to be carried out according to the existing contracts.

100. But not additional mileage?—Very little additional mileage. There may be a few branches in some cases. With regard to the Oudh and Rohilkund Company, which is the latest of all the guaranteed companies, their works are not yet finished, and they will, of course, be carried out according to the existing contracts.

101. Passing from that general sketch of the railway policy to the financial distinction between the ordinary and the extraordinary works, and when that distinction was made, will you be good enough to explain that to the Committee?—The distinction between ordinary and extraordinary expenditure was first carried out in the year 1867-68. The extraordinary expenditure was supposed to be outside the means of the Government from its ordinary income, but money was not to be borrowed for it unless it was necessary; that is to say, a fixed expenditure was supposed to be carried out on works undertaken by the Government, so as to carry on those works in a proper manner, whether there was a sufficient surplus revenue or not. So far as it could be met by the surplus revenue it was to be so met, otherwise the money was to be borrowed for it. The conditions under which the works were to be sanctioned as extraordinary were, that after a full inquiry the Government should be satisfied that they were likely to pay interest sufficient to cover the borrowing of the money, and perhaps also to repay the capital. Rules were laid down from time to time to restrict the expenditure to works which came within those conditions.

102. When was that definition adopted?—In 1867, and the expenditure first appears in the accounts of 1867-68.

103. Is it, in short, this: that an extraordinary public work was one which was expected to be remunerative, and an ordinary public work was one which was not expected to be remunerative?—Yes, that was so.

104. But it was somehow combined with the idea that an ordinary public work must be created out of income, and an extraordinary public work might be partly created or wholly created out of borrowed money?—Yes, certainly.

105. To your mind have I fairly stated the object of the definition?—Yes, but exceptions have been made as in the case of the Indus Valley

and

Chairman—continued.

and the Northern Punjab Railways, as I mentioned it before.

106. Will you explain in what respect they are an exception to that rule?—Because they are not likely to pay the interest on the capital expenditure.

107. Then the theory is, that every extraordinary work pays sufficient interest?—Yes.

108. But nevertheless certain works have been classed as Extraordinary which have not been expected to pay interest?—Yes, that is to say the necessities of the case, for instance, induced the Government to set aside in those particular cases that rule, and to take the work as extraordinary, although it would not pay.

109. Then an extraordinary public work, according to the later and modified rule, has included such works wholly or partially to be constructed with borrowed money, whether they paid or not?—Yes, but I do not think that there is any case except that in which the Government has departed from that rule, except, of course, that there are cases where works were supposed after careful inquiry that they would pay, but it has turned out that they were mistaken on that point, and they have not paid. Those works, of course, continue to be charged to "Extraordinary," and have continued to be a burden, so to speak, upon the capital outlay which the Government has incurred.

110. When a work has been put in the category of an Extraordinary work, has an estimate been made of the amount which would be contributed from the revenue, and the amount which would be contributed from borrowed money, or has that been left to follow the financial circumstances of the year?—The latter has been the case.

111. So that an extraordinary public work might be entirely constructed out of annual income?—Yes; I think that the proper way, perhaps, for that to be looked at is, that the Government resolved to borrow for this work, if necessary, and if it was not necessary, so much the better.

112. The first condition being strictly its being a paying work, and the modification having come afterwards, the result, I presume, of financial exigency, to include certain non-paying works?—Yes.

113. I understood you to say that the theory, in the first instance, was that they would pay?—Yes.

114. And that has been in practice modified since certain works which it was known would not pay became included in the general class?—Yes.

115. That theory was originally laid down in 1867; when was it shaken by those after considerations?—I do not think that it has actually been shaken.

116. When was it modified?—That was when it was necessary to undertake those two lines of railway to which I have referred as urgent works for military purposes. Orders were not given for their being charged upon any fund that we had to "Extraordinary." It was rather looked upon in this light, that the railway system would pay as a whole, and we might include some lines which would not pay.

117. May I say that up to last year that theory of the distinction between extraordinary and ordinary works, with the modification which you

Chairman—continued.

have given, may be conceived to have been in force?—Yes, and more so; the Secretary of State reiterated it after we had undertaken the Indus Valley and Punjab Northern Railway, with the permission to continue the works which were already in progress, but not to undertake others unless on full inquiry we were satisfied that they would pay; so that those works are quite exceptional in being included as "extraordinary" under the circumstances.

118. When was that?—That was in 1875, if I remember rightly.

119. You are prepared, are you not, to give the Committee some facts and some figures with regard to the financial result of the policy in past times as to public works; in the first instance, can you give us the amount that has been spent by the guaranteed railway companies?—I have the latest Finance and Revenue Accounts that they have at the India Office up to the end of March 1876; the amount of subscribed capital is 95,811,016 *l.*

120. That is to say, that the total capital raised is something less than that for capital expenditure?—Yes, and probably about 2,000,000 *l.* of that is not yet spent; it is paid up, but is not all spent.

121. About 96,000,000 *l.* altogether has been raised by the guaranteed companies for public works?—Yes; and that, I should say, includes the Madras Irrigation Company, which is nearly 1,000,000 *l.*

122. Would you now give us the amount which has been spent by the Government up to the last account on State railways?—On State railways, up to the same date, the expenditure was 12,069,362 *l.*

123. How much of that 12,000,000 *l.* was raised by loan, and how much of it came out of revenue?—There is only 283,870 *l.* which has been charged as ordinary.

124. The whole of the balance has been charged as "extraordinary"?—Yes, it has been charged as "extraordinary," but, as I explained before, I cannot say how much is actually borrowed, or how much is from revenue, but it has been charged as "extraordinary."

125. If you add to that expenditure the irrigation expenditure, can you then state how much of the two may be considered to have been borrowed, and how much to have been raised on revenue; would that relieve you at all of the difficulty of distinguishing?—No, I could not say.

126. Is all that the Committee can get this, that as much of that as the annual revenue would bear has come out of the revenue, and that the rest has been provided out of loans contracted to make the two ends meet generally?—Yes, that is as far as I am able to say, but I hope the Committee may be able to get more perfect information from the Financial Department.

127. Will you now give us the figures of the irrigation expenditure, whether by the companies or by the Government?—By the companies there is nothing but the 1,000,000 *l.*, which is included with the railways at page 6 of the Return from which I have been quoting. For the expenditure by the Government on irrigation, I cannot refer you to one of these statements, because the information had to be got out from two or three places, and is included in papers which I drew up, with the assistance of the Financial Depart-

Major Gen. *Dickens*, C.S.I. 7 March 1878.

Chairman—continued.

ment, at the India Office, and which are, I think, in your hands. At page 4, the capital outlay to the end of 1875-76 is 15,562,655 *l.*

128. Are you now going to give us the total expenditure by the Government on irrigation works, whether since the distinction was drawn between works extraordinary and ordinary, or before that distinction?—Quite so. Out of the expenditure of 15,000,000 *l.*, 7,210,861 *l.* has been classed as "extraordinary," and the remainder as ordinary expenditure, which is chiefly the expenditure in former years.

129. And the difference has been classed as "extraordinary" since the distinction was drawn between the two?—That I shall be able to come to presently in describing the change in the accounts carried out in the set which I submitted to the Committee.

130. That sum is the total expenditure from the very first?—Yes, from the very first, on works of which we keep Capital and Revenue Accounts as "extraordinary" works.

131. How far back may we say?—In the case of the Western Jumna Canal it goes back to the year 1821.

132. You have now given us, I think, the total figures of railway construction, whether by the companies or by the Government, and of the irrigation works constructed, whether by the companies or by the Government?—Yes.

133. Then, taking each in turn, would you tell us, if you please, what has been the financial result of that expenditure. Will you take the railways first, and will you state what has been the balance, whichever way it may be, between working expenses and interest against such receipt; perhaps you will take the Government guaranteed railways first, then the Government railways, and then irrigation works?—The account will be found in Nos. 1 and 2 of the Supplementary Account, which has recently been drawn out. It will be found that for the year ending March 1876 the net traffic receipts of the guaranteed railways are 3,920,877 *l.*, and that the expenditure on guaranteed interest, moiety of surplus profits, and cost of the Government expenditure on land and control, is 4,979,500 *l.*

134. Therefore for that year what is the result?—Therefore there was a loss on that year of 1,058,623 *l.*

135. That loss was, was it not, the difference between the gain upon some lines and the loss upon others?—Yes.

136. Wherever there was a moiety of interest paid to the companies, there was a gain, was there not, upon that system?—Yes.

137. That is the guaranteed railway account for the year 1875-76; will you now pass to the State railways?—On the State railways the gross traffic receipts are 289,512 *l.*; it is only a beginning and the receipts are but small. The interest and working expenses come to 868,485 *l.*, leaving a loss on the State railways of 578,973 *l.*

138. That charge includes 675,000 *l.*, does it not, for interest?—Yes.

139. Have you in that year marked the particular loans raised for those works, or have you taken the interest at a certain rate upon the total capital expenditure?—If you will turn to the last account in that Paper which has been prepared by myself, in communication with the Financial Department at the India Office, it will

Chairman—continued.

be seen that we transferred a part of the debt to Reproductive Public Works at an interest of 4½ per cent., and that is charged against the State railways.

140. Then you have taken the exact capital expenditure upon the State railways, and you have calculated exactly 4½ per cent. as the fair rate of interest upon the expenditure, and in that way you arrive at the figure which should be debited during the year 1875-76?—Not quite so; the amount applied to the construction of works prior to 1875-76 is 8,800,000 *l.* and odd, and during 1875-76, 3,186,000 *l.*, with a balance unapplied in March 1876 of about 3,000,000 *l.* We thought it fair, in making the account, to charge the State railways with the money, such as would be raised for them if the loan had been directly for State railways; that is to say, including not only the expenditure of the current year, but the expenditure for one year to come.

141. Is that equitable, considering that you only borrow to meet actual financial necessities?—We thought it was better to make the charge in that way to prevent any objection to the account on the ground of its being too favourable to the State railways.

142. Then you practically have treated yourselves as a separate corporation having to build these railways, and you have assumed that you would raise that capital a year in advance?—Yes; I thought that was fair, for the reason which I have stated already, that the Government of India has been in debt for years, and if it had not expended so much money upon railways, it might have paid off the debt, and so saved itself that interest.

143. That deals with the guaranteed railways and the Government railways; would you now give us the corresponding figures as to irrigation?—We have taken the entire capital expenditure on irrigation as applied to the construction of the works, whether ordinary or extraordinary, up to the year 1875-76, as 14,260,509 *l.* The expenditure during 1875-76 was 1,302,146 *l.*, and the balance unapplied of the sum which we have transferred is 1,437,345 *l.*, so that we have charged the Irrigation Account with interest at 4½ per cent. on 17 millions, although the expenditure up to the date of these accounts is only, as I before stated, 15,600,000 *l.* and odd. Now, as to the year's accounts, we have an income of 1,228,993 *l.*, and interest and working expenses, 1,161,751 *l.*, leaving a surplus profit of 67,242 *l.*

144. Before criticising those figures, I should like to go backwards a little; can you give the corresponding figures for a series of years past, or the total amount during a number of years past?—We can give them, although not with the same completeness as we have got them here, because we have only lately been able to get the figures from the local governments. There has been some difficulty, which I will explain presently, about getting the actual capital accounts and the actual receipts. But in those forecasts which were made by the Government of India in Lord Northbrook's time, and which are printed in No. 3 (App. No. 3) of the Papers laid before the Committee, I can give you the details. A small abstract will be found at the top of page 409, showing a progressive loss on irrigation operations; that is to say, the profit is not so great at the end of the period embraced, which is partly prospective, as it is at the beginning; and that is because we calculate

Major Gen. *Dickens*, C.S.I.

7 March 1878.

Chairman—continued.

calculate upon a capital outlay which has increased in a larger ratio than the profits grew. I had better refer to page 401 first, and that gives a statement of the actual and estimated total net income from irrigation works, commencing from the year 1869-70 and proceeding to the prospective year 1879-80. It will be seen in that account that we have to exclude the works in Madras and Bombay, because we have not got such details as we could make a proper account with. But taking Bengal, the North Western Provinces, and the Punjab, it will be seen that the income from irrigation works in 1869-70, in the last line of the page, was 444,469 *l.* That year was the year succeeding the scarcity or partial famine of 1868-69, and which, therefore, is rather an exceptional one of receipt from irrigation works. The next year the amount was 380,763 *l.*; in the year following, 1871-72, 331,213 *l.*; and in 1872-73, 282,822 *l.* That year, 1872-73, was a year of remarkably favourable rainfall, and consequently the water taken from the irrigation canals was a smaller quantity, and the income was lower. In 1873-74 the income rose again to 351,216 *l.* That is the last actual item in that account.

145. Can you give us from any other account the following year, 1874-75?—We have got the following year, 1874-75, although it is an estimated year. It was estimated quite close to the period at which the accounts came in, and the income there is 369,041 *l.*

146. You have already given us, I think, 1875-76?—Yes; but what I have given for 1875-76 includes Madras and Bombay, of which we have got sufficient materials to give a fairly accurate account now, but we had not at that time.

147. May we understand that the figures which you have now given, which are on page 401, are constructed, except as to Madras and Bombay, on the same principles as the capital charges as you have described 1875-76 to be constructed?—Not quite, because we have only charged the actual capital outlay.

148. Will you describe the difference between that last year and those previous years?—We have charged the capital outlay as money which it is supposed would have been borrowed if the Government had been borrowing for public works directly instead of taking the money from its general resources, whereas in this account we have charged only the actual expenditure; that is to say, if we had depended entirely upon borrowed money we should have had to borrow somewhat in advance of our expenditure.

149. And you have taken it, as in the case of railways, as one year's apprehended expenditure in advance?—Yes.

150. Can you give us now, with respect to the railways, the corresponding figures backwards, beginning with the guaranteed lines?—The account begins in 1872-73 at page 392; in 1872-73 the charges against the guaranteed railways, that is to say, the expenditure incurred by the Government, and interest, and so on, amounted to 2,271,557 *l.* That year, it should be stated, was rather a bad year, a year of commercial depression in India. Next year, 1873-74, the loss was only 1,589,789 *l.*; the next year, 1874-75, we have got a nearly complete account showing the loss to be 1,230,170 *l.* The figures that I gave the Committee for 1875-76 show a loss of a little over a million; so that it will be seen there has been a continuous growth of the traffic receipts, and a continuous reduction of the charges.

Chairman—continued.

151. Those are actual cash payments, therefore there is no question of cultivation?—Yes; but I draw the attention of the Committee to the figure which has been entered in this forecast at page 392 for the year 1875-76. You see that we calculated there that the loss might be as high as 1,684,000 *l.*; actually it has turned out to be only 1,058,623 *l.*, so that our forecast has been very much more than justified.

152. Will you give us the figures for the third class of State railways?—The year 1871-72 is the first included in this account. We had then only one railway, which was the Calcutta and South Eastern Railway, taken over from a company because it did not pay. The receipts in that year were only 4,064 *l.* In the next year it did not pay the working expenses, and it has just barely paid the working expenses since. The next year we had also another taken over from the company, the Mutla (or Calcutta and South Eastern) Railway. The receipts in that year were only 5,362 *l.* The year after, 1873-74, they had to incur a great deal of expenditure upon the Calcutta and South Eastern Railway, and there was a loss on the railways of 6,474 *l.* The year 1874-75 was the first in which we began to get anything from our new railways. The receipts on the regular estimate, which is nearly an accurate account, were 38,100 *l.* Of 1875-76 I have already given a more complete account.

153. How do you justify the rule which you appear to have laid down of charging interest on capital not actually expended; you charge interest on capital expended before it becomes remunerative, but you also charge interest on capital not actually expended?—This was done merely with the view of placing the account of the works in such a position as it would have been if we had had to do the work upon what money we borrowed; we should then have had to have gone to the market for money in advance of our expenditure.

154. You do not think that the mere fact of your being a government, and not having to act as a company, would render it unnecessary to make up an account on that principle?—I cannot say. If the money was to be borrowed in the Indian market, I think there might be difficulties, and the Government might like to be a little in advance, so as not to be met by an unfavourable state of the market.

155. As a matter of fact, the Indian Government never has, I believe, been in that position?—I do not know that it has been, certainly. With regard to the guaranteed companies, I should say it puts the State works in the same position as the guaranteed companies, because there the interest has to be paid in advance of the capital expenditure.

156. Do you think that the result of that rule is that the three classes are practically put upon the same footing?—Yes.

157. Will you be good enough to explain what is meant by the word "forecast," and how this system of "forecasts" is worked?—The system of forecasts was established in Lord Northbrook's time. He thought that we should have a programme of our expenditure and of our probable receipts, and we accordingly drew out a scheme

Major Gen. *Dickens*, C.S.I.

7 March 1878.

Chairman—continued.

for the construction of the operations which we had in hand, and the receipts that we expected to realise from our works in the form of tables which are given in these papers, and they were published and submitted to the Secretary of State. The object was to see whether we could continue the operations on the scale on which we were proceeding without loss, and the result of those calculations showed that we might; that although our works were not paying interest at present, our proceeding with the operations on the scale there laid down, would not involve us in any heavier charge.

158. What has been the general result of those forecasts; has the result been disappointing or has the result been satisfactory?—It has been satisfactory.

159. Speaking of the guaranteed railways first, what has been the result?—I have already stated the result as regards the guaranteed railways, that they have exceeded our expectations very much in their earnings.

160. Will you state to what you attribute that?—The growth of the traffic has been greater than we expected; and in a very great measure it is due to the famine of 1873-74. On that occasion the Government told the railway companies that they would stand the loss on carrying grain at very reduced rates; and the railway companies accordingly established very reduced rates for the carriage of grain, and they worked at a large profit.

161. Has it developed a very large Indian grain traffic?—Yes.

162. The Government paid the difference between what?—They paid the difference between the rates which the company would have realized on that occasion, 1873-74, if it had charged its old rates, and what it actually did charge.

163. Without any rebate for the large increase of traffic?—Yes; and the company, however, were so satisfied with the effect of those reduced rates, that they spontaneously reduced their rates in the following year without expecting the Government to pay anything.

164. The Government only paid them with respect to one year?—Yes.

165. Has a great development of grain traffic arisen from that policy?—I think partly from that policy, and partly, I believe, a grain traffic with Europe has set in since, and we attribute it in a great measure to that policy of reducing their rates.

166. When you go on to later years, are those causes sufficient to account for the still greater development of the last two years?—Yes, including the fact that there was a famine last year, and of course there was a very large grain traffic in consequence.

167. To what extent did the grain famine last year contribute to the railway receipts?—I am afraid I have not details enough to answer that question, but I have no doubt that it contributed very largely; also there was a grain traffic to the sea.

168. Is the foreign grain traffic from India increasing at the present time?—It did increase very largely. I do not know whether that increase continues, but it is to be hoped it will.

169. Then we may take it that the forecast of the guaranteed railways has been very agreeably disappointed?—Yes.

170. And that that is due in a great extent

Chairman—continued.

to the development of the grain traffic?—I think so.

171. And partly to the prevalence of the famine, which has unfortunately developed it?—Yes.

172. Take the railways constructed by the Government, how has the result agreed with the forecasts?—We had in the forecast for 1875-76, net receipts 74,356 *l.*, and we have got net receipts for that year 96,999 *l.*, so that the forecast was fairly answered.

173. Do you happen to know anything of 1876-77?—No.

174. May we take it that the forecast also has been within the mark as to the State railways?—I should think very fairly, but I believe the construction was a little behind our expectations, and possibly there may be a little falling off on that account.

Mr. *Balfour.*

175. Did the famine have any effect upon the forecast of the Government railways as it had upon the guaranteed railways?—Probably little, but the transactions are very small comparatively.

Chairman.

176. Then, as to the irrigation works, I am afraid that very much the reverse is the case, is it not?—Upon the irrigation of 1875-76, we expected a net receipt of 367,070 *l.*, and we have got a net receipt for those three local Governments, excluding Madras and Bombay, of 352,894 *l.*, showing a slight falling off.

177. Therefore not only is the net receipt estimated at somewhat falling, but the result has been below the estimate?—Yes, slightly.

178. Can you give any explanation of that?—So far as those years are concerned, it probably is a mere matter of seasons; but the further falling off which was looked for is a matter of the growth of interest, charges being more rapid than the growth of revenue. The growth of revenue from irrigation works, according to our experience hitherto, has been very slow. For instance, in the Ganges Canal, which is not an unfavourable case, it took about 14 years before the income reached 4 per cent. And in such a case as that, if the capital expenditure is rapidly increased, of course the increase of returns would not follow for a long period afterwards, even if the works were quite successful. As far as our forecast goes, that is the sole reason for the falling off, because we estimated the probable profits from our knowledge of the individual works, and of the new works according to our experience of the past, in the same climates and conditions.

179. Then, taking the figures for the moment of the three classes together, what is the total result?—I take the figures in the Account Nos. 1 and 2 in the new prepared Accounts, where we have the total income from railways and irrigation works given as 5,439,382 *l.*, and the total charges, 7,009,735 *l.*, giving for that year a net loss of 1,570,353 *l.*

180. How does that compare with the previous years?—In our forecast for the same year, we anticipated a loss of 2,179,394 *l.*, so that, on the whole, we are very much better than the forecast.

181. Comparing not only with your forecast, but with the actual results of previous years, what are they?—The actual result in 1872-73, which

is

Chairman—continued.

is the first year which is given here (not including Madras) of the irrigation works, was 2,357,696 *l.* loss in 1872–73; in the year 1873–74, it was 1,780,833 *l.*; in 1874–75, on the regular Estimate, 1,575,705 *l.*

182. Before leaving the mere figures, what is the total mileage of the guaranteed railways at present?—Five thousand eight hundred and ninety-eight miles opened to end of 1876, and 315 miles in progress; total, 6,213.

183. What is the total actual mileage of the State railways?—Nine hundred and thirty-four miles opened.

184. Can you also give the total mileage of the system of State railways, so far as it has been sketched out at present?—Two thousand seven hundred and 15 miles, as at present sanctioned; but it will no doubt grow much beyond this.

185. I asked you some time ago about the guaranteed railways, whether there was originally a scheme in Lord Dalhousie's time, I think you said, No, although there had been a more perfect one since; is there in existence at the present time a scheme for the entire *réseau* or net work of State railways?—There has been a scheme prepared. We had one in the Public Works Office, but it was never recognised as a sanctioned scheme.

186. Has it not been approved, either by the Indian Government or by the Secretary of State here?—No; but you will find something approaching to a scheme at pages 414 and 415 of the Account, No. 3 (App. No. 3). It will be seen there a list of the projects in hand, with the expenditure proposed to be incurred on each, in the first page; and in the next page there are the names of the railways, and the moneys proposed to be expended upon them.

187. I will now pass to more detailed questions about irrigation; you have given us, with respect to the irrigation works, the calculated result of the difference between the receipt and the expenditure, will you be good enough to explain to the Committee by what process in each Presidency or part of India you calculate the receipt?—There is a note to No. 1 of these new accounts of revenue which the Committee should refer to. But in Northern India the custom has been to charge what is called a water-rate to the cultivators, and that is levied entirely independently of the land revenue. But besides that, the land revenue, as the Government share of the rent, the Government get two-fifths, or whatever it may be, according to local custom; and of course if means of irrigation are brought to the land in addition to the payment which the cultivator makes as the price of the water, the rent improves, and that improvement shows in the land revenue. In order to get at that improvement, the land revenue being in those parts re-assessed, or re-settled, as the term is, once in about 30 years, the settlement officer, who is a revenue officer, not a canal officer, goes over the country, village by village, and assesses the revenue for the re-settlement, and in so doing he takes for each village the effect of the irrigation. In some villages, perhaps, the land has deteriorated and the irrigation is debited with the loss. In other villages, in the majority of them, the rent improves, and the irrigation is credited with the improvement which this officer judges to be due to the irrigation.

Chairman—continued.

188. Are you speaking now of Bengal and the North-Western Provinces?—Of the North-Western Provinces and the Punjab. The sum which is so estimated will be found entered as a deduction from the land revenue in the second line of No. 1 of these accounts. It is deducted from the land revenue, and added again to the irrigational income, the figures being 92,281 *l.* in the North-West Provinces, and 105,264 *l.* in the Punjab.

189. Then that is added again in the irrigation revenue?—Yes, the figures there are 375,659 *l.* in the North-Western Provinces, 288,360 *l.* in the Punjab. The difference of those figures is due to the water-rates and other minor items of income which were not included at all in the land revenue.

190. Has that been always the system of calculating the irrigation receipts in the North-Western Provinces and in the Punjab?—Yes, with this difference, that the re-settlements have only been carried out of late years, and in the earlier period there was no established system of valuing the increase of land revenue.

191. On the other side will you be good enough to say the expenditure; is there any indirect expenditure, or is the whole of the expenditure direct?—I think you can hardly say there is any indirect expenditure; there might be a small amount, the cost of collecting the land revenue, but it would be very small.

192. Is it debited with the other expenditure?—I think not; I think this is merely the share of land revenue. In Madras the system is different. There by the Ryotwarree settlement the whole demand was taken from the cultivator as land revenue, so that as soon as the irrigation was brought within his reach, he was charged for what are there called wet rates of land revenue. Accordingly the whole appears as land revenue, and is not separately shown in any way, and that accounts for the difficulty which we have had in getting at the returns.

193. Are the Committee to understand that in the account for 1875–76, which you have given us, of the irrigation revenue of Madras, that increase is not included?—We have got that increase from the administration reports of the Madras Government. They have been a long time urged to separate the account, and they have shown an account, probably not a complete one, in their administration report which we have taken and made use of here for want of anything better.

194. Then you have included that amongst the receipts in Madras for 1875–76?—Yes; we have taken it out of the land revenue in the same way as we did in the North-Western Provinces, and put it into the irrigation account, but we can only submit it as a probably approximate result; it is not received yet as a final adjustment.

195. But before 1875–76 nothing of the kind had been done?—Before 1875–76 nothing was done, and the consequence was that the engineer officers claimed very large receipts, and other people here who were opposed to irrigation said that the receipt was nothing, because it was not shown in the accounts, and it was a very unsatisfactory state of things. Passing from Madras to Bombay, in Bombay the receipts are chiefly in Sindh, and there the state of things is very peculiar. There is no cultivation at all, practically, unless there is irrigation, and the ques-

Major Gen. *Dickens*, C.S.I.

7 March 1878.

Chairman—continued.

tion is, whether the whole of the receipts from the land are to be credited to the irrigation, or a portion of them. I do not think that the question has ever been settled authoritatively, but we have, in preparing this account, done with Bombay as we have done with Madras. We have taken what they have shown themselves in their administration report. In Bengal, unfortunately, there is no increase of land revenue to be attributed to the works. The difficulty there is that in some cases there is a perpetual assessment of land revenue, and in others the Government has undertaken not to increase the land revenue in consequence of its engagement with the Irrigation Company, so that there is no such thing, one way or another, as any receipt from land revenue there. All that we can get is from the water rates, and at present the water is taken to so small an extent that the receipts are very small.

196. At what time and under whose authority was the system adopted of crediting the indirect profits to irrigation and not to land revenue?—I am afraid I cannot say when it was exactly, but I can say, in a general way, that the irrigation officers years ago claimed something for the effect on the improved land revenue in the North-Western Provinces, and at some period, probably between 1855 and 1860, or thereabouts, instructions were issued to the settlement officers to assess the amount; but I think the Committee will have an opportunity of examining the officers, who know more about it than I do.

197. When did it become the established rule to credit it in that way; that is to say, when were the departments authorised to frame their accounts on that system?—I cannot say exactly when it was; but probably 15 years ago at least.

198. Will you be good enough to take the principal irrigation works, and give us detailed information about them, taking the Punjab first?—The Baree Doab Canal is the northernmost area of those green spots on the map. That was work undertaken by Lord Dalhousie's order shortly after the annexation of the Punjab. It is not to be taken that the whole of that area is irrigated, but that the irrigation extends over that district. That work has been in operation some 20 years, I think. It will be seen that the capital expenditure upon that is about a million and a half pounds sterling, and during the year 1875–76 it paid something short of 3 per cent., but the short return that year was due to some damage to the head works from very severe floods in the valley of the Ravee.

199. What has been about the average return?—I think the average return has been about 4 per cent. within the last few years.

200. Is that an income entirely due to the British Government?—Yes, it is entirely British. There was no large irrigation work there before; there was a small work called the Huslee Canal, which was in operation there before, but it was a very small affair compared with the Baree Doab.

Mr. *Balfour*.

201. That capital outlay of 40,000*l.*, which is put down for 1875–76, is not normal, is it?—Yes; that is normal. The outlay on repairs of head works is charged to working expenses, and so reduced the expenditure. The Western Jumna Canal was one of the old native works which was restored by the British Government; it had ceased to flow about the year 1740, and the British Government re-opened it in 1821, and it has been improved and extended very much since then; it had been 80 years closed, and the remainder of the old works are very small now, probably not worth 100,000*l.*

Mr. *Balfour*—continued.

Chairman.

202. Have you included those in the capital?—No; they are not included. The capital is 432,000*l.* expended by the British Government, and on that the canal pays nearly 24 per cent.; but then, of course, that is under very favourable circumstances from not only having some works which are not due to capital account, but also from the people of the country having been accustomed to irrigation, and being used to pay for water for irrigation.

203. It would be reasonable, would it not, to add something for the former work?—Yes, that might be done, but it has never been valued. It should be mentioned, also, that the works even yet are very imperfect, and there is a great deal of damage to the country and loss of water from the imperfection of the works, and a large expenditure is about to be incurred to put them in a satisfactory condition. When that is done, the probability is that it will yield a larger revenue due to the outlay, but the return per cent. on capital outlay will not be anything like what it is now.

204. Why do you charge it to indirect expenditure; do you charge any per-centage upon the general administration and salaries beyond those of the persons immediately employed?—No; there is no such term as indirect expenditure.

205. I refer to supervision; do you charge nothing except for the actual persons employed?—We charge those who are absent on leave, and so forth, and all the charges connected with it.

206. But you charge no share of the general expenditure of the country?—No share of the expenditure of the country, and not even for pensions, for which some charge might be reasonably added, but it would not be very large.

Mr. *Onslow*.

207. I understand you to say that this per-centage is calculated after you have deducted the payment of all the officers engaged upon that particular canal?—Yes; and a share of the salary of the chief engineer of the supervising establishment of the local government. The accounts department is also charged.

Chairman.

208. What is the next irrigation work?—We have got a series of works, the Lower Sutlej and Chenab Inundation canals, Upper Sutlej, the Indus, and the Shahpur and Shahiwal works. Those are what they call inundation canals. They are very simple works, very little more than ditches, larger or smaller cut to take the water when the river rises in the periodical rains and carry the floods of the river over the country. In those dry parts, but for these canals, as there is little or no rain, there would be no cultivation.

209. And I presume they are not directly remunerative?—They are very largely remunerative, but the income is altogether mixed up with the land revenue, and it is difficult to separate it from

Chairman—continued.

from the land revenue. The Sirhind Canal is a very large work, which has not begun to irrigate yet. It is in progress of construction. The expenditure incurred is nearly 1,200,000 *l.*, but rather more than double that has to be spent before the work will be finished, and then it is expected to be a very useful work. It is producing nothing at present.

210. Have you included the interest on that in the calculation?—No. The Swat Canal is a new work which we have lately undertaken; it is one of those very little green places which you see at the top of the map. That is taken from a small river in those parts, and one of the objects is to induce the wild tribes to come in and take to cultivation. It is a very dry tract, and if they get water they will probably cultivate it and leave off their predatory habits. Those are the principal works in the Punjab.

211. According to what you have told us, nearly one-half of the expenditure is necessarily unproductive at the present time?—Yes.

212. What interest does that amount of expenditure which is productive of nothing bring in in the whole of the Punjab?—It is very difficult to say, because we have here the Baree Doab Canal, which is giving under 3 per cent., and the Western Jumna Canal, which is giving 24 per cent.

213. But still you can add the productive capital and the net receipt?—Yes; that would be about 9 per cent. on the capital brought into that calculation in those two works; but then that takes in the very favourable case of the restoration of the old canal, the Western Canal, which is exceptional.

214. If you allow for that, would not 8 per cent. be about the correct amount for the Punjab?—No, not more than six or seven.

215. What are you looking forward to in the rest of the system?—I should think probably six or seven per cent. ultimately.

216. That may be taken as the official estimate of the Punjab irrigation works?—Yes, I should not expect more.

217. Would you now pass from the Punjab to the North Western Provinces, and give us the particulars of those works?—We have first the Eastern Jumna Canal; that is also an old work which was restored by the British Government, but it had only been one year in operation apparently under the native government. The capital outlay incurred by the British Government was 231,743 *l.*, and its yield in the year 1875–76 was 25 per cent.; it is a comparatively small work.

218. How much ought to be added to the 230,000 *l.* for the former work?—I should think in that case very little indeed.

219. You mean that you could have a construction like that formed at a very small expense?—Yes; and the work was so defective that it could not have continued to carry water, until the construction of new works. Then upon the Ganges Canal we have spent 2,826,479 *l.*; that was commenced in the year 1841; it is entirely a British work, and was opened in 1854, if I recollect rightly, and has been going on ever since, and it now pays 6 per cent.

220. What is the nett income?—For the year 1875–76 it was 170,000 *l.*

221. Is that a fair calculation?—Yes, I think so.

Chairman—continued.

222. Has it produced 6 per cent. for some years past?—For the last four or five years I think that it produced something about that.

223. Do you think the expenses include anything in the nature of restorations, or are you still spending on capital account?—The expenditure on capital account is going on. The original design has been modified. Instead of carrying out the whole design of the original canal, another canal has been taken from the Ganges lower down, and the original canal will run into that. The irrigation will thus receive a second supply lower down the Ganges, and carry the water in that way down to the end of what is called the Doab (which means a space between two rivers), at Allahabad.

224. This is by far the largest irrigation work, is it not, that has been undertaken by the British Government?—Yes, the largest that we have got in actual operation. This Ganges Canal, with the Lower Ganges Canal lower down, on which we have spent 875,000 *l.*, constitutes practically one scheme for the irrigation of the country between the Jumna and the Ganges, and we expect that the works will pay something at the same rate as the original Ganges Canal in the course of years, which will be something about 6 per cent.

225. Do you take this as a test case; is it the most perfect case that you can give us of a great work by the British Government?—Yes, I think so.

226. And one originated since we became masters of the country?—Of that style, because the Madras works are quite a different style, and I will describe them presently.

227. And that six per cent. you will give as the fair and honest cost of the canal?—No, it would be rather more; say six, or seven, or eight per cent.

228. What is still going on on capital account?—I think there is not very much more on the Ganges Canal, but I think, with regard to irrigation works, the first part of the capital account is always least remunerative, because it consists of the large channels, and the dams across the rivers, which are very expensive, and which do not yield in themselves anything. The works which yield immediate profit are the small distributary channels, and those are what remain to be carried out; so that I think there is no fear of the capital account there running away with the profits.

229. There is no suspicion of any charges of the nature of reconstruction, for instance, going to capital account?—There has been a great deal incurred in the Ganges Canal on that account which is already charged, and I do not think there is much more. The canal was made with too rapid a fall at first, and they had to put in a number of weirs, and alter it in various ways in order to bring it down to a satisfactory fall.

230. And was the whole of that charged to capital?—Yes.

231. Is there any rule laid down in the Public Works Department about closing the capital account, as it is popularly called?—I think, practically, we find that we cannot close it entirely, but what we do is to put all the charges we possibly can into the revenue. For instance, in the Ganges Canal the other day there was one of the locks blew up, and the engineers were very

Major Gen. *Dichens*, C.S.I.

7 March 1878.

Chairman—continued.

anxious that this should be charged to capital, but we only permitted them to charge the improvement to capital; the actual cost of restoring was charged to revenue, and went out of the working expenses.

232. When the irrigation of a district may be said to be complete, is not the account closed then?—It would be closed if ever we came to such a state, but I do not think it is nearly come to that yet.

233. I mean not when the entire canal is constructed, but a particular part of it. Do not you then arrive at the end of the capital account?—Yes, but still improvements might be called for which would pay something, and which would be too large to be charged altogether to revenue.

234. Do you mean too large in the sense of being permanent, or what?—In the sense of the improvements exceeding the whole revenue; in fact, we deal with them in much the same way that the English railway companies do. The next is the Agra Canal, which is a new work with a weir over the Jumna, a little below Delhi. That has been opened quite recently, and has hardly begun to pay a revenue yet, and it appears in the accounts here with an excess of expenditure. It does not yet meet its working expenses, but it will probably eventually pay about the same as the Ganges Canal. The Rohilkund canals are small works in the Lower Himalaya, which have been going on for a number of years. They are very small works, and are carried on according as the improvement of the district goes on. They were originally begun to get a settled population there, and to bring swampy land under cultivation, the drainage and irrigation together. The Bundelkund Works, the Eastern Ganges Canal, and the Bundelkund new canals are works which have hardly yet been settled. In fact, only preliminary operations have been carried on with them.

235. Then taking the North Western Provinces together, what do you give as the official estimate of the return of irrigation expenditure when the works are finished?—I should think about 6 per cent. or 7 per cent.

236. Do you think we may safely take that, making all allowances for incidental charges on lands?—Yes. We have got in the Eastern Jumna Canal a very favourable example. In Bengal we have got the Orissa and the Midnapore project, and the Tidal Canal, which, in fact, are one work, which we took over from the Irrigation Company, but I am afraid they will never pay. The great scheme which was sketched out by the Company has only been partly carried out, and though the work will be very good as an insurance from famine, and the water may be more or less used eventually for cultivation, I do not think it will ever be taken so largely as to do more than pay the working expenses at the very most, and we must just accept that loss.

237. The works, I think you say, are in a very incomplete state?—Yes, in a very incomplete state.

238. Can you give the Committee some idea of the extent of the project, and how far it has been carried out?—On the map it is shown by the green and yellow. The yellow shows what remains to be done, and the green is what is actually carried out. It is probable that the navigation may be very successful when the canals are united so as to give long through navigation, but very expensive works are required to connect the two portions of the canal, and we have hitherto not approved of anything further being done until it can be shown that it will be profitable.

Chairman—continued.

239. How far is it the intention of the Government of India to prosecute those works?—When I left India the intention was to leave them as they are, and only go on bit by bit, as it can be shown that each portion would reduce the loss or increase the profit upon the whole.

240. As it is, what is about the loss on the works?—The loss is about one per cent.

241. Is that on the price at which they were taken over by the Government?—One per cent. upon the whole outlay, which is partly by the Government and partly by the company.

242. You mean by that that there is an actual loss and working expenses exceeding the receipt by one per cent. upon the capital?—Yes.

Mr. *Hardcastle.*

243. This is the first time you mention the navigation producing something on the canals. On the Ganges Canal, and on other canals, is navigation carried on?—Yes, on the Ganges Canal it is, but it does not produce much revenue.

244. Then, I suppose, such as it does produce is included in your calculation?—Yes; it is included, but it is a very small sum.

Chairman.

245. How would you explain the loss on the Orissa Canal; how is it that the receipts are not actually equal to the working expenses?—Because the people do not take the water.

Mr. *Balfour.*

246. Would it pay them to take the water if they could be induced to do so?—I think probably it would, but we can hardly say with any certainty yet.

Chairman.

247. You said just now that the works might be carried on further, as the Government saw that they would reduce the loss or bring a profit; have they as yet seen that at all?—No; all that has been done is to complete what has been put in hand. I should say that at one time it was supposed that the people would take the water, and that led to the works being carried out by the Government beyond the extent to which the company had carried them, but the expectation was not realised, and though we hope that the water may come into use to some extent by-and-bye, we do not expect it to come into use to such an extent as to make the canals pay.

248. I see that in 1875–76, on the Orissa Canal, there was a capital expenditure of above 100,000*l.*?—Yes.

249. That has just ceased, has it not?—Not quite, I think.

250. What would be the total expenditure if the original scheme were carried out in its entirety?—It would probably come now to something like six millions, but I do not think there is any intention whatever of going so far as that.

251. The total amount spent is about 1,600,000*l.*?—Yes; and when it is finished so far as the Government intended to finish, it will probably be about 1,800,000*l.*

252. Does

Mr. *Fawcett.*

252. Does that include the purchase-money to the company?—Yes; it includes that.

Chairman.

253. Were the company paid off anything like their expenditure?—Yes; they had 50,000 *l.* bonus.

254. How much will the three projects together, the Orissa, the Midnapore, and the Tidal, come to, when the works which are now intended to be completed are completed; will it be as much as three millions?—The expenditure will be about 2,800,000 *l.* The next is the Soane Project, which is only just opened for irrigation. It was a project which was originally got up by myself; it was afterwards given to the Irrigation Company and they commenced it, and it has been gone on with since. It has not been long enough in operation yet to see how it will succeed; but during 1873-74 we had very satisfactory evidence of its use in the impending famine. It saved nearly half a million pounds worth of crops, by throwing the water roughly over the country. I think it was about 160,000 acres of crops that were saved by that means.

255. What is the actual receipt according to the last account; what is it bringing in?—It does not pay its working expenses yet.

256. Is the work not finished yet?—No, it is not finished yet, but it is sufficiently advanced to begin irrigating.

257. What is the departmental estimate of the per-centage of profit?—About 7 per cent.

Chairman—continued.

258. And the department has seen no reason to think that that was an over-estimate?—No, I think not. Of course it is a new part of the country to begin irrigation in, but otherwise we have no reason to doubt that it will come to that.

Sir *George Campbell.*

259. You said it was commenced by the Irrigation Company. I think, practically, they really did nothing towards it?—They did very little.

260. They did not do anything, did they?—They only spent, if I remember rightly, about 14,000 *l.*

261. They spent money on surveys, but I do not think they put in a spade?—Possibly not.

Chairman.

262. And then it was taken over by the Government?—Yes. The other projects that are mentioned here, the Tirhoot, the Hooghly, and the Damoodah are not carried out, and the charges that are entered are merely as surveys.

263. Then practically in Bengal there are only the Orissa and its allied projects and the Soane Canal?—Yes.

264. The Soane Canal is expected to pay 6 or 7 per cent. as well as those in the North Western and the Punjab, but the Orissa was a total failure?—Yes; the Orissa may ultimately pay working expenses.

Major Gen. *Dickens*, C.S.I.

7 March 1878.

Thursday, 14th March 1878.

MEMBERS PRESENT:

Mr. Agnew.	Mr. John Cross.
Mr. Ashbury.	Mr. Fawcett.
Mr. Balfour.	Mr. Hardcastle.
Sir George Campbell.	Mr. Sampson Lloyd.
Mr. Childers.	Mr. Onslow.

THE RIGHT HONOURABLE HUGH C. E. CHILDERS, IN THE CHAIR

Major General C. H. DICKENS, C.S.I., called in; and further Examined.

Major Gen. *Dickens*, C.S.I.

14 March 1878.

Chairman.

265. AT the last meeting of the Committee, I think we brought you up to the point of describing the irrigation works in Bengal; we postponed, however, a question which I was going to ask you, as to the earlier history of the Orissa Canal; would you be good enough to state to the Committee tersely, and not with a view to going into the subject of the controversy with the company, what the early history of the canal was?—The Irrigation Company was formed in 1861 to carry out works in the deltas of the Mahanuddy and allied rivers similar to the works of the Godavery and the Kistna, in Madras. It was presumed by officers who were experienced in Madras irrigation, that the results in such deltas would be similar to those in the Madras Presidency, and that the water would be acceptable to the people, and would be taken in the same way as it was taken in Madras. But the climate is very different; the rainfall is much more favourable to rice cultivation, and the people are not accustomed to the distinction which is made in Madras between wet and dry cultivation; that is to say, in Madras, whenever the means of irrigation are afforded, the land is assessed at a wet rate, which is higher than the dry rate, the cultivation being more profitable, and the people are consequently willing to take the water when it is supplied to them. But in Orissa that was not the case, and the people are still unwilling to take the water if they have to pay for it. In 1865-66, the great Orissa famine occurred, and about that time the company's funds were exhausted; they had raised about a million without guarantee. The Government then advanced money to go on with the works. A great deal of complication arose from the disappointment of the company as to the profits, and the difficulties in satisfying them with the arrangements in regard to revenue, which led the Government of India to propose to purchase the whole works at cost price, with a bonus of 50,000*l.* to the company to clear away any difficulties in the matter, and this purchase took place in 1869. The scheme of the works was revised about that time by the Government officers, who were officers experienced in Madras irrigation, and who still retained the same sanguine hopes as regards the works that existed at the time when they were first undertaken. In revising the project, it was still believed that they would pay a good return for the money. Those hopes, however, have been disappointed, and the water is still not taken by the people, and the works remain unprofitable, and there is very little prospect of their becoming profitable.

Chairman—continued.

266. Was there any previous arrangement between the Government and the company in the nature of a guarantee?—There was no guarantee. The Government undertook to give the land free and to arrange to receive the proceeds of the irrigation, collect them for the company, and pay them over to the company.

267. In making the transfer from the company to the Government, was the value of the work assessed in any way, or was regard only had to the original expenditure?—The Government had had the work inspected by some of its officers previously, who had reported favourably, and on the faith of those inspections they accepted the works at their cost price.

268. Without going into much controversy, the Government assumed that they were buying what was worth the money that they gave?—Yes.

269. Now we will go on to Madras; what are the principal irrigation works in the Madras Presidency?—The oldest great works in the Madras Presidency are those in the district of Tanjore, in the delta of the Cauvery, and the Coleroon; the dam upon the Cauvery was an old native work. The river branches into two, the Cauvery and the Coleroon, at the head of the delta; the old dam was established upon one of those, and in the course of years the water began to flow off into the other, and irrigation from the old native work constantly fell off, and the country began to diminish in prosperity. After several reports upon this, Sir Arthur Cotton was called in, and placed a dam upon the other branch, also, of the Coleroon, and the consequence was that the country was restored to its original prosperity, and an increase of irrigation took place.

270. Is that a work which was entirely undertaken by the Government?—The second dam was; the first dam was a native work before the British times.

271. What is the financial result of that work?—It

Chairman—continued.

—It is very large indeed. According to a statement which we have prepared from the best returns we could get, it paid about 85 per cent. of the original capital expenditure; that is, of course, without the expenditure on the native works existing previously.

272. Had the works existing previously been assessed at all?—Not that I know of.

273. Can you give the Committee a rough estimate of what their value would be; that is to say, how much the British Government was saved by the existence of those works, if it had been a new construction?—No, I cannot say; but I should suppose that it would be under 100,000 *l.*

274. And the expenditure by the British Government was how much?—About 134,000 *l.*

275. Then it would be only fair to take the interest for the time as interest upon 230,000 *l.*, instead of 130,000 *l.*?—Possibly. At the same time I should say that the old native work had fallen into such a state that, if the new work had not been constructed, it would in time have ceased to be profitable at all.

276. Still that does not relieve you financially from the necessity of considering how much you were saved by the existence of the old work?—No.

277. When you speak of that rate of revenue on the capital, do you make the computation of the revenue in the same way as you have made it on the canals that we have already considered?—So far as I know; but, as I have said before, we are obliged to take this account from the latest Madras Administration Report without details; they profess there to have investigated the subject, and to have corrected the capital account, and so on; but I can only take that as the best information we can get. I cannot vouch for it in detail at all.

278. There is no direct revenue from the canal, is there?—The revenue is entirely taken with the land revenue, that is to say, it is the difference assessed between wet and dry cultivation.

279. I mean, there is no direct return for the actual benefit received; it is included in the improvement of the land revenue?—Yes, that is the actual return; it is not, of course, a paper return; it is the actual money received by the Treasury.

280. But you calculate that by subtracting the former land revenue from the present land revenue?—Yes.

Mr. *Onslow.*

281. I understand that they do not actually pay for the water consumed?—The whole thing is taken in the difference between wet and dry cultivation; they are assessed for wet revenue.

Chairman.

282. Will you pass on from the Cauvery to the next work?—The next work is the Godavery. That is entirely a British work, which was designed and laid out by Sir Arthur Cotton. From the latest accounts that we have, the expenditure on it was 736,400 *l.*, and it gives a return of about 17 per cent.

283. This was a work, was it not, which was unconnected with the company?—Yes, entirely undertaken by the British Government.

284. Will you be good enough to explain the nature of that work?—A dam was run across the River Godavery, at the head of the delta, extending about four miles across the heads of various branches, and from that dam channels are taken down the different divisions of the delta, and by that means the water of the river is applied to rice cultivation at a season when the natural fall of rain would be very uncertain, and might not enable a crop to be raised at all.

Major Gen. *Dickens*, C.S.I.

14 March 1878.

285. Is that work completed, or is there any capital expenditure going on now?—The capital expenditure is still going on; it is being gradually extended, and will go on extending until as much water is utilised as can be got from the river.

286. Can you estimate at all what the capital expenditure is likely to reach?—I should say perhaps 400,000 *l.* or 500,000 *l.* more.

287. Making altogether about 1,300,000 *l.* to 1,400,000 *l.*?—Yes, probably.

288. What has so far been the financial result of that work?—It now pays an excess revenue of 127,500 *l.*, being a return of 17·3 per cent. upon the capital hitherto expended; that is net revenue.

289. And when the remaining 400,000 *l.* or 500,000 *l.* is expended, do you expect as good a return?—Yes; I should think very little less. It might be a little less, because the works are more expensive now than they used to be at the time that the first construction took place.

290. Will provision have to be made for large repairs?—No, not that I know of; there is no apprehension of that.

291. Is anything of that kind provided for in the estimate out of revenue?—Yes.

292. Will you go to the next work?—The next work is the Kistna.

293. What has been the capital expenditure there?—The character of the works is exactly the same as the Godavery, except that the dam across the head of the delta is not so extensive. The capital expenditure is 463,600 *l.*, and it gives a return of 14·3 per cent., as near as we can get it.

294. What is the excess revenue?—£. 66,500.

295. Is the capital expenditure account in that work virtually closed?—I think there will probably be extensions, and there may be as much as 300,000 *l.* or 400,000 *l.* to be expended; but the extensions will only be carried on to the extent to which they are likely to be profitable.

296. May we anticipate that the profit will be one approximating to the same rate, namely, 14·3 per cent.?—Yes, I think so.

297. May we take it that the total amount of about 800,000 *l.* will probably complete that work, as against 1,300,000 *l.* to 1,400,000 *l.*, in the case of the neighbouring works on the Godavery?—Yes, probably.

298. Will you pass to the next irrigation work?—I think those are the principal irrigation works in the Madras Presidency. I do not know that I could give the details of the others at present, unless the Committee would wish me to do so; however, they are not of so great importance.

299. Putting them together, about what would the expenditure be; of course not including the Madras Company?—There are four or five more works of a somewhat similar character (namely, dams across rivers) with a smaller capital out-

Major Gen. *Dickens*, C.S.I.

14 March 1878.

Chairman—continued.

lay in the Madras Presidency, which are classed as extraordinary, on which the expenditure hitherto amounts to something short of 400,000 *l.* Most of them are not in work as yet; they have only been lately carried out, and have not commenced irrigating.

300. Are they expected to be remunerative?—Not to the same extent as the old works.

301. What sort of interest do you hope to get?—Probably 6 or 7 per cent., I should think.

302. Will that comprise all the works except the Madras Company?—There are two works which I mentioned, two tank projects on which a rather large outlay has been incurred.

303. Will you explain these tank projects?—Those two projects are near Madras, one called the Red Hills Tank, and the other the Chembrumbankum Tank. The expenditure on those two has been about 173,000 *l.*, and in both cases we have been very much disappointed with the estimate; the expenditure has been much larger than was expected, and the works will probably not prove profitable.

304. Perhaps you will do well to explain to the Committee something of the nature of those tank works, which are historically of great interest in India, are they not?—They are formed by throwing dams, generally earthen dams, across valleys, and so arresting the water and retaining it until required for irrigation. Small channels are led from the tank above the dam, which traverse the country, which is commanded by the water, and so enable crops to be produced. In many cases the valleys are dammed with several dams in succession, from near the head of the valley, at intervals of one or two or three miles, according to circumstances, and each tank has its irrigation channels led from these dams.

305. In what shape is the revenue from those collections of water received?—In the same shape as I have before mentioned. As soon as means of irrigation are supplied to the land, the land is in most cases assessed at once as wet cultivation, and the people cultivate rice instead of dry crops.

306. In what way is the water carried into those tanks?—In most cases the channels are dry, or nearly dry in the dry season, and they receive the water during one monsoon; and in some cases the tanks in Madras are open to two monsoons, one in July and August, and the other in November and December; but there is very little drainage from the channels except during the monsoon, and that is what renders them so valuable, as they retain the water after the monsoon has ceased, and enable the crops to be grown.

307. In former years those tanks in different parts of India were very abundant, were they not?—There are an enormous number of them in the Madras Presidency in the tract, which is coloured blue on the map.

308. Are the old tanks generally in good order, or have they been allowed to get out of order?—There are still some old tanks, I believe, which have not been restored, but I believe the greater part of the old tanks have been restored and put in good order now.

309. Is the revenue collected from them in the same way as the new tanks?—In the same way, as far as I know.

310. Only the assessments have been of ancient date?—Yes, the custom of the country

Chairman—continued.

from time immemorial is that the assessments are made in that way.

311. So that in giving the general irrigation result in India you have excluded all the results which commence before the British possession?—Yes; that is to say, that the account which I have presented shows only the receipts from the works which we have classed as extraordinary.

312. Would it be possible to estimate in any way the amount of revenue which is being derived from the ancient works as well as from the modern ones?—I can only give it in a small rough way. In the Madras returns they distinguish the land revenue between wet and dry, and about 2,000,000 *l.* sterling are derived from wet revenue.

313. Would the whole of that be what you may call irrigation revenue?—Yes, if the works failed, the whole of that would revert to dry revenue, and probably not exceed half the amount.

314. Would it be possible, with any approach to accuracy, to estimate what the capital expenditure analogous to that revenue would be?—That would be very difficult.

315. Could you not do it even approximately?—You might arrive perhaps with some labour at the valuation of the works as they would be, according to present prices; but that would be a very different thing from the actual value of them as constructed in olden times.

316. How frequently is the wet revenue adjusted?—I am not acquainted in detail with the revenue history of Madras, but I believe it is adjusted from year to year.

Mr. *Fawcett.*

317. You do not put down the whole of the wet revenue to represent the return on irrigation work, do you?—No.

318. You ought to deduct, of course, from the wet revenue the amount of revenue which the land would yield if not irrigated?—Certainly. I was only giving that as an illustration why I could not give the return from the works; but the Chairman asked for some general indication of what is represented by the wet revenue.

Chairman.

319. Would the 2,000,000 *l.* be in your view the difference between the wet and the dry revenue?—No.

320. Would it be higher?—The 2,000,000 *l.* are the sum total of wet revenue.

321. Could you give ever so roughly any idea of how much the dry revenue would be as represented in that?—Very roughly indeed; I should say that fully half would be due to the works.

322. Then may we take it that in the Madras Presidency there is due to the former tank works a nett revenue of something like a million sterling a year?—Deducting what has been taken credit for with the modern works that million will be the total.

Sir *George Campbell.*

323. Do I understand that the million includes the ten works in the Madras Presidency?—Yes.

Mr. *Fawcett.*

324. Do any of the papers in our possession show in any particular case the amount that we have

Mr. *Fawcett*—continued.

have deducted for what you may say is dry revenue, because whatever importance is to be attributed to the accounts seems to me to depend upon that; when you say that the Godavery returns 17·3 per cent., do the accounts which have been laid before Parliament show that in getting at that 17·3 per cent. what has been deducted for dry revenue?—We have not got the accounts in detail yet; we have been a long time urging the Madras Government to forward them. There has been great difficulty in preparing them, for several reasons. The last Administration Report gives the latest result which they have arrived at; but we have not the means of testing it as yet. There are many reports which give the matter in a partial way; but we have nothing as yet which is accepted both by the Revenue officers and the Canal officers of the Madras Government.

Chairman.

325. When you stated 17·3 per cent., I presume you took that from the figures as the increase of revenue, and not the gross revenue?—It is understood to be the increase.

326. But your department has no information upon the subject?—No, only very imperfect information.

Mr. *Fawcett.*

327. What you are telling us now about the returns from the works is what the Madras Government have told you, or told the office; you have not seen at all how they arrive at this result, and therefore you do not wish us to suppose that you are in any way responsible for their accuracy?—Not in detail; but I have seen enough of the matter from the reports of our officers which have been sent by the Government of India, and otherwise, to be able to say that I believe the returns quoted to be not far from accurate.

Mr. *Onslow.*

328. Unless you can distinctly define what is wet and what is dry revenue, how do you come at that per-centage; you say you do know what the dry revenue is; how can you calculate that the works yield a profit of 17 per cent.?—I only get it from the Madras Government Administration Report.

Mr. *Sampson Lloyd.*

329. You stated that it was excess revenue; that, I presume, is the difference between wet and dry revenue?—It is supposed to be so.

Sir *George Campbell.*

330. Is this 17 per cent. the figure upon which the Public Works authorities of Madras and the Revenue authorities of Madras have concurred together; or is it only the Public Works Department that have made this report?—I understand that it is the concurrent of the two departments, but I am only able to say so from the return being put forward by the Madras Government. The statement includes, as no former return did, the whole of the capital expenditure.

331. Does it appear from the return signed by the Government of Madras to the Governor General, and that it is not signed only by the Public Works Department?—Yes.

Mr. *Onslow.*

332. I understand that you are not answerable for that figure in any way?—No; except so far as it coincides with what I have been led to expect would be the result of inquiry.

Chairman.

333. Then the million which you have stated before as the total nett Irrigation Revenue of Madras includes a quarter of a million, or thereabouts, which is the nett revenue from the Madras works?—Yes; but I wish to say that that is a very rough statement indeed, and I do not put it forward as anything accurate.

334. Is there any tank system to any extent like the Madras system in the other Presidencies?—To a small extent in Bombay.

335. I mean in the provinces which we have gone through as yet, namely, in Bengal or the Punjaub, or the North Western Provinces?—In British territory in Rajpootana, that is, in Ajmeer and Mahirwaree there are tanks.

336. Are they tanks of ancient construction?—Some of them are of ancient construction. A great many were constructed and some of the old ones restored by Colonel Dixon, who was one of our first district officers in that country.

337. To what extent, about?—As near as I can remember there are something like 200 tanks.

338. And representing about what capital expenditure?—That is very difficult to say, because the works were constructed in a very primitive way in Colonel Dixon's time. He got the people to give their labour free, and the actual outlay was very small.

339. What could you actually construct them for now, do you think, speaking roughly?—I should think probably 60,000*l.* or 70,000*l.* in all.

340. Do they return a revenue?—Yes, some of them; but for the works which we have undertaken recently, we find that we can hardly get a return on the capital outlay in that part of the country; barely the interest.

341. Before leaving Madras, would you give us the outline of the Madras Company's works?—The Madras Irrigation Company was formed in 1859. A guarantee of 5 per cent. on a million sterling was given by Lord Stanley to encourage the execution of the irrigation works by British capitalists, and the work was to be selected by the Government of Madras. At that time there were very sanguine expectations of the profitableness of irrigation in the Madras Presidency, but the selection appears to have been unfortunate, and the execution of the work apparently not altogether satisfactory. It consists of a dam across the Toongabuddra river, and a canal from the dam. A million was spent without finishing the work, and the Government then advanced 600,000*l.* more to enable the company to go on, of which the company has since repaid 228,000*l.* The works have never paid even the working expenses until, I believe, last year they did so in the famine time. I have never seen any clear report as to the cause of failure, but I believe it is much the same as in the case of the Orissa works. In that part of the country I understand that the people have not been accustomed to be assessed for wet revenue directly means of irrigation are placed within their reach, and their dry crops are profit-

Major Gen. *Dickens*, C.S.I.

14 March 1878.

Chairman—continued.

able, so that they are not willing to take the water.

342. Not at any price?—So far as I know, but I have very imperfect information.

343. What is the position of matters at this moment?—The position of matters at this moment is that the Government, I believe, refuses to advance any more money for the working expenses, and the company will have to meet them out of their own resources.

344. That is to say, out of the guaranteed interest?—Yes.

Mr. *Hardcastle.*

345. May I ask how did the company obtain the 230,000 *l.* which they have repaid to the Government?—I believe they raised it in the market, but I am not quite positive about that.

346. It is not the profits of the working?—No.

Chairman.

347. The company's accounts, I suppose, are published?—Yes.

348. And if we want more detail we must obtain it from them?—Yes.

349. But so far as the Government are concerned, that is, speaking generally, the information which you possessed up to the time when you left India?—Yes.

350. Does that then complete the general account of the irrigation works in Madras?——

351. Was it a mere guarantee of a maximum sum, or a certain sum, or if the profits exceeded the guarantee; did any part of it revert to the Government?—Yes, I believe it did, after they made a profit of 12 per cent.

352. Then did the whole, or part, revert to the Government, do you think?—I am not quite sure.

353. In other respects it may be taken then that, under the 12 per cent., it is a mere guarantee of so much a year?—Yes.

354. But if the working expenses exceeded the income, the shareholders had to bear the difference?—Yes, the Government has actually borne it hitherto.

Mr. *Fawcett.*

355. The shares throughout the time when the Government has been paying all this money, and paying working expenses, have always been considerably above par, have they not?—Yes.

Chairman.

356. I understood you to say that, if the working expenses exceeded the receipts, the company had to pay the difference?—The company might have been obliged to pay, but the Government did not insist upon it until quite lately.

357. Your contract with the company was that the company were to bear it, but the Government relaxed that condition?—The Government did not wish to press it, because that would probably have led to the work being thrown upon the hands of the Government.

358. I should like you to give a little more fully the figures as to this company; the capital, I think you stated, was 1,000,000 *l.*, upon which 5 per cent. was guaranteed?—Yes.

359. With a possible repayment after a certain rate of profit?—Yes.

Chairman—continued.

360. Afterwards, I think, you said that 600,000 *l.* was advanced to the company, of which 230,000 *l.* has been repaid?—Yes.

361. Can you state the amount which has been actually paid by the Government within the 5 per cent. guarantee, the amount which has been paid in excess of the 5 per cent. guarantee on account of the deficiency of the receipts to meet the working expenses, and the amount which the Government has lost in the shape of interest on the advances?—The amount paid under the guarantee up to the latest account is 811,751 *l.* 19 *s.* 10 *d.*; the amount paid for excess of working expenses is 49,200 *l.*; the interest on the advance amounts to 208,854 *l.*

362. Can you also state what was the precise reason, so far as you know it, which induced the Government to advance the 600,000 *l.*?—It was provided in the contract that, after the guaranteed capital of one million was spent, the company should be allowed to raise further capital with guarantee to complete the works if necessary. They were unable to raise it in the open market so the Secretary of State lent the money.

363. What was the nominal or real security upon which the 600,000 *l.* was advanced?—It was a first charge on the on the revenues of the company from the works, excluding guaranteed interest.

364. Was the 600,000 *l.* advanced in one sum, or at different times?—At different times.

365. Is the sum advanced on account of the excess of working expenses over the receipts deemed to be still a debt from the company to the Government?—Yes.

366. Were the works approved by the Government?—By the Madras Government, I believe they were, but not by the Government of India. It was left to the Madras Government under the contract.

367. Was the contract between the Government of India and the company, or between the Madras Government and the company?—It was arranged in the India Office in London, but it was between the Madras Government and the company.

368. Who was the engineer by whom those works were originally projected?—Colonel Calverly Cotton was the company's chief engineer.

369. Can you also state who was the Government engineer who approved of them?—Colonel Rendall was the Madras Government consulting officer at the time.

370. Can you state why this particular work was adopted by the Government?—It is presumed that the Madras Government selected this work on the advice of its engineers as the most promising project.

371. Will you be good enough to say now what irrigation works have been undertaken in Bombay and Sindh?—With one exception the irrigation works which have been undertaken in Bombay proper, that is, exclusive of Sindh, are small works, comparatively. They are the Hathmati, the Lakh, the Palkhair, and the Krishna canals. The outlay on the largest of these works, the Krishna Canal, is 117,000 *l.*, and on the others smaller sums; altogether under 200,000 *l.*

372. Is expenditure going on upon these works now?—To a small extent.

373. Are they bringing in revenue?—Yes, they are bringing in a very small revenue at present; but our returns are very imperfect.

Chairman—continued.

374. On what principle is the revenue from those works in Bombay calculated; is it the same as in Madras?—No, all the revenue is at present credited to them as revenue independent of the land revenue. Of what is collected by the land revenue we have as yet no return.

375. Do you mean that the Bombay Government have failed to supply those returns to the Public Works Department?—They still remain included with the land revenue, and we have no means of separating them.

376. Is there the same distinction in Bombay between wet and dry land?—No, I think not, and that is what constitutes the difficulty of getting the returns.

377. Have you been in communication with the Bombay Government on the question?—Yes, and we understand that the returns are in course of preparation, but they have never reached the Government of India yet.

378. When they are prepared will they show the difference between the land revenue before the works and the land revenue after?—We understand that they will.

379. And that difference will be credited to irrigation?—Yes.

380. But you have not yet got even approximate returns?—No.

381. That is extremely inconvenient, is it not?—It is a very great inconvenience to us.

382. Have the Public Works Department pressed them?—Yes; the subject has been a long time under consideration, and they have been urged frequently to do it, but it is a difficult business, and they have not yet done it.

383. Will you explain to the Committee a little more clearly what it is that you have asked the Bombay Government to give you?—To give us the same return of the increase of land revenue due to those works which we get from the North Western Provinces.

384. Not the total increase of land revenue of the district, a part of which may be due to other causes, but the increase which they can assess as fairly due to irrigation works?—Exactly so.

385. If you had that, you would be able to give us the same information as to the financial result of the works in Bombay, as you have given us with reference to Madras and the other provinces?—Yes, I should state that those four which I have mentioned are all recent works. There is no very large increase of land revenue as yet to be derived from them.

386. As they stand without this indirect revenue, do they show a surplus or a deficiency?—We have got a small surplus, so far as the returns go, but they are so very imperfect that I cannot rely upon them at all.

387. However, this only relates to some 200,000*l.*?—Yes.

388. What other works are there in Bombay?—We have two tank or reservoir works. One of them is the largest work of that kind which we have undertaken, the Moota Lake and Canal.

389. Will you describe that work to the Committee?—It dams the upper valley of one of the rivers near Poonah. The dam is of masonry, and I believe about 96 feet high. The work is not yet finished; the reservoir and the dam are finished, but the extension of the canal is still going on, and the expenditure up to the end of 1875–76 was 380,000*l.*

390. What will be the total expenditure when that work is completed?—I believe about 500,000*l.*

391. Is that work as yet producing revenue?—It has produced a very small revenue at present, and we cannot say from experience yet how far it is likely to pay; but the water seems to be taken, and there seems a fair prospect of its giving a return of 5 or 6 per cent.

392. This was a very considerable work; when was it projected?—I think it has been about six years in progress.

393. Was it approved by the Public Works Department?—It was approved by the department. The scope of the scheme was greater originally, and it was reduced by the Government of India until they should have better means of judging how it would turn out.

394. What was the estimated profit of this work, when it was decided upon?—The estimated profit when it was first decided upon was rather larger, but the cost of the work exceeded the original estimate, and the estimate of profit in the latest returns, to the best of my recollection, was reduced to about 6 per cent.

395. Does that include the indirect profit about which you have no information yet from the Government of the Presidency, on an expenditure of about half a million?—Yes.

396. And a net revenue of about 30,000*l.* a year?—Yes.

397. But up the present time the revenue is comparatively very small?—Yes; the work is only just beginning to irrigate.

398. Have you any reason to doubt the accuracy of the figures, and the fairness of the estimate?—I think it will probably return 5 or 6 per cent. I might mention that the work is an important one in connection with the famine, because it is a case in which the reservoir is made to hold more than one season's supply of water.

399. Many of the small works, which you have been describing, being fed twice a year, and only holding one year's supply, or even less?—Yes, that is so.

400. Who was the engineer who was responsible for this work?—I believe it was Colonel Fyfe, but I am not quite certain.

401. Did it come as a project from the Government of Bombay?—Yes.

402. Do you remember what the larger estimate of the capital expenditure was before the Government of India cut it down?—On reference to the papers I find the first sanctioned estimate was nearly 300,000*l.* This was found insufficient, and a revised estimate was sent up amounting to 532,897*l.*, which the Government of India cut down to 465,400*l.* The latest estimate is 491,583*l.*

403. Do you think that the half a million of money, of which you have spoken, will really close the account?—I think it might be made to do so, but that will depend upon how the profits of the work show. In case it shows itself to be profitable, I think it is very likely that the Government of India might sanction an extension.

404. Is there any other work in the Bombay Presidency?—There is another tank, the Ekrook Tank which is something similar to it, but rather smaller. The capital cost is something short of 100,000*l.* The work is something of the same character as the Moota, but on a much smaller scale.

405. What

Major Gen. *Dickens*, C.S.I.

14 March 1878.

Chairman—continued.

405. What has been the financial result there?—It has not been much at present.

406. Do you look forward to that work as likely to be successful?—I think it is doubtful.

407. To what would you attribute the failure?—I think that the capital expenditure is larger than the supply of water will enable it to repay.

408. Even including the full amount of the indirect profit?—Yes.

409. Are there any other cases of similar failures in the Bombay Presidency?—No; that is to say, none are included in the works that we have classed as extraordinary.

410. Are there some other irrigation works which have been classed, so as to be included amongst the ordinary works?—Yes, there are some; but I cannot say much of their returns; because that would require me to go into details, of which I do not retain a recollection at present.

411. Are they small works?—Yes; none so large as those to which I have been alluding.

412. Was the fact of their being included in the ordinary work an indication that they were not expected to pay?—No; I think they were within the powers of the Bombay Government to sanction in former days, before the distinction was made between ordinary and extraordinary.

413. But so far as you know, they have not been successful?—Not generally successful; I cannot say that there have been no cases of success amongst them.

414. In the Bombay Presidency there is no such general system of ancient tanks as there is in Madras?—No, not so largely developed. I think that in the southern part of the Bombay Presidency there are several ancient tanks.

Sir *George Campbell.*

415. Is the blue mark on that map to be understood to be tank irrigation?—Yes.

416. Is it not the case that that is exclusively confined to tank irrigation which is directly in the hands of the Government; is there not a vast mass of tank irrigation over the central part of India which is not marked on that map; is there not some very fine tank irrigation in the central provinces, which is maintained by the people themselves?—Yes, there is a great deal of that, no doubt. I am speaking now entirely of what is classed as extraordinary.

Chairman.

417. Your answer refers only to Government works?—Yes.

Sir *George Campbell.*

418. And that map on the wall only refers to Government works?—Yes.

Chairman.

419. Will you tell the Committee what irrigation works there are in Sindh?—The irrigation works in Sindh are entirely of the kind known as inundation canals; they are very small and simple canals so dug as to receive the water of the Indus where it rises in flood, and carry it over the country. Most of them are quite of that character; but in one or two cases, as in the Nara works, permanent head works have been added to regulate the supply of the water. Altogether the expenditure on these works up to the end of 1875-76 by the British Government is 668,000 *l.*

Chairman—continued.

420. Was there any previous expenditure before the time of the British Government?—A great deal. There was a large series of such works, which have been very much extended by the British Government.

421. Can you give the Committee any idea of the value of those works upon the basis which we have indicated before; that is to say, how much it would have cost you if you had had to construct them?—No; I am sorry to say I cannot. I have not sufficient information—not even approximately.

422. But the value of those works is very great indeed?—There is a large extent of them. The works are of a cheap kind. I do not know that you can say that the existing value is very large, because they depend so much upon annual clearances to keep them going.

423. What has been the financial result in point of nett revenue?—The state of the case in Sindh is that, without water being thrown upon the country in some artificial way, there is scarcely any cultivation possible, because there is no rain. Those works are credited with a very large revenue, being a large proportion, and in some cases the whole, of the land revenue derived from the country; and those returns which we have given from the latest information afforded by the Bombay Government still require to be criticised before we can accept them as altogether accurate; but, taking them as they stand, it is 24 per cent. upon the entire outlay.

424. You gave the expenditure at 668,000 *l.*; what is the total revenue?—The net revenue is 161,368 *l.*

425. What per-centage does that give?—A little over 24 per cent.

426. There is, however, a considerable capital outlay now going on, is there not, on those works?—Yes.

427. Can you say what that figure 668,000 *l.* would be raised to when the works are finished?—I should think probably to a million, but it is very difficult to say, because the works are extended as experience leads the Government to extend them.

428. Will not the revenue be increased?—Yes.

429. And should you say that, in your judgment, 24 per cent. is anything like the future estimated revenue when those works are finished?—I should think not so great as that. I should think one-half the amount probably is as much as we could expect, but it is very difficult to say, because it is all involved in this question of how much of the revenue derived from cultivation is fairly attributed to the water and how much to other causes.

430. But the figures which are given to you by the land revenue officers are intended, are they not, to be the actual improvement due to the water?—Yes, so I understand.

431. And you of the Public Works Department have accepted them with more or less criticism?—We have accepted them as the best we can get at present, but we have never received the final report laying down the principles on which the division between the land revenue and the irrigation revenue was to be made, and

until

Chairman—continued.

until that is received and discussed we cannot give anything very reliable.

Sir *George Campbell.*

432. Is not Sindh a part of the country which is absolutely rainless, and in which there can be no cultivation at all except by inundation from the rivers?—Yes.

433. So that the only question is whether the river itself is to inundate the land, or is to be carried over the land by those canals?—Yes, and of which the charge should be put on the other hand as debitable to the capital expenditure; but you have to include the working expenses, because some people say that the whole of the administration of the Province should under those circumstances be included in the working expenses. It is a difficult question, and one which requires to be argued out.

Chairman.

434. Resuming that question, generally you have from the North West Provinces and the Punjab a fair estimate of the indirect revenue?—Yes.

435. Have you from Madras also a fair estimate of the indirect revenue?—I may say with regard to Madras and Sindh, we have estimates of which the only question is whether they are not too favourable, and may have to be cut down.

436. You are not disposd at present to accept them with the same confidence as you have the estimates from the North West Provinces and the Punjab?—No.

437. But with respect to Bombay, you can get no estimate at all?—We hope to get it, but we have hitherto not got it, in a correct shape.

438. That is not, therefore, a very complete statement of account, but taking the whole subject together, what would you say was the result financially of the irrigation works in India?—This account which we have got gives the rate per cent. upon the capital outlay up to date of 5⅓rd or 5·33.

439. Do you think that on the whole that is a fair account?—Yes.

440. Do you think that when you get to the Bombay indirect revenue, it will not make your balance probably exceed the estimate in Sindh and Madras?—No; the Bombay capital, I should mention, is a comparatively small sum, and does not affect the total very much.

441. In estimating that 5⅓rd per cent., you think that so far as the land revenue is concerned, the deficiency on the one side of the estimate fairly balances the excess on the other?—Yes; I think so.

442. But it does not include at all what may be termed the capital expenditure by former native governments?—No; but at the same time I think I may say that the capital expended by former native governments is certainly less than half a million; I am speaking now of all India.

443. You mean by that, that the works which are left out do not represent more than half a million expenditure?—Yes; I mean the works that are included in this return. I do not of course value the works which are excluded from the return, the Madras tanks, and so forth, the cost of which is very large indeed.

Chairman—continued.

444. The revenue of three quarters of a million is not included in that return?—No.

445. But taking the works which you have described, and which you have given to us in detail, and which are the only works contracted wholly or in part by the British Government, you have described a capital outlay of about 15½ millions?—Yes.

446. On that 15½ millions you think that the return may fairly be taken at 5⅓rd per cent.?—Yes, including the enhancement of the land revenue.

447. But you have omitted altogether in that calculation the half million at which you value the works as they come over to us from the native governments?—Yes.

448. If that is included, would you say that about 5 per cent. would be a fair return for the irrigation works?—Yes. At the same time I should mention that this expenditure includes the whole of the expenditure up to date, and includes therefore a great many works on which a large expenditure has been incurred, from which no returns have yet been begun to be received.

449. Then we should go a little further, and ask you this: if you include the works which are in progress, and upon which you have told us some millions have still to be spent, and some of which you have described as not likely to be very remunerative and some as remunerative, what is a fair estimate of the return for the whole of the irrigation works now contemplated?—I think we might say from 6 to 7 per cent. probably.

450. You think that the incomplete works will be so remunerative that they will raise the average of the interest from 5 to something above 6 per cent.?—Yes.

451. When you speak of 5 per cent. or above 6 per cent. when the works in progress are completed, do you include in that any special revenue due to famine, or do you take that as a fair average of a series of years?—An average of a series of years.

452. In the report of 1875-6 which you have given us, and which we have analysed, is there any considerable amount of special famine revenue?—No, I believe not in any part of India.

453. Therefore we may take it as the official Public Works Department calculation of those works spread over a long series of years, that they may be deemed to return in the future somewhere about 6 per cent.?—That is my belief, 6 or 7 per cent.

454. Are there any other irrigation works contemplated by the Government of India up to the time of your leaving, which should be added to those which you have described?—A good many projects have been under consideration from time to time, and I have no doubt that some of them will ultimately be reduced to a shape in which the Government of India will be able to sanction them, with the approval of the Secretary of State; but I do not think there are many others that are likely to be immediately taken in hand. We have got a great deal in hand already, and the funds which are at present available for the purpose would not suffice to carry on more with advantage.

455. We have it on our notes as to each work, but

Major Gen. *Dickens*, C.S.I.

14 March 1878.

Chairman—continued.

but I do not think we have had the total from you; you have given 15½ millions as the capital outlay by the British Government so far, and half-a-million as the probable value of the works taken over from the former governments, and you have given us some detailed figures of the amount required to complete the existing works; can you give us the total of that last figure?—It would require a long investigation to give any detailed report on the total probable outlay. But I can state approximately that an additional expenditure of about nine millions will probably complete all that is now in hand, making 25 millions in all. I have no doubt that a much larger sum may with advantage be spent gradually on irrigation.

456. Then the total cost of the irrigation works now completed or in progress on the part of the British Government, including the value of the works which they inherited, and including the charges not yet defrayed, may be estimated at 25 millions?—Yes. But that includes only the more important works, of which we keep capital and revenue accounts, and which have been hitherto classed as "extraordinary."

457. The total net income making a fair adjustment as to the land revenue may be taken at about 1 millions sterling?—Yes.

458. And that represents interest at the rate of between 6 and 7 per cent.?—Yes.

459. I will now take you to the question of account; you have described to us the manner in which the expenditure on public works hitherto has been charged, and the distinction between public works ordinary and extraordinary. Will you explain what is the change which was proposed in 1877 in respect to the form of account which the Government of India are now carrying out?—In September 1877 the Secretary of State addressed the Government of India on the subject of the accounts of the Indian Empire, in various points, but principally with regard to the form in which the accounts of public works were exhibited. He said, "The policy which has been deliberately adopted is, as you are aware, that under certain conditions prescribed in my Despatches of the 23rd of July 1874, No. 387 (paragraph 57), and the 10th of August 1876, No. 305 (paragraph 76), productive works of public improvement shall for the future be constructed out of borrowed moneys, the interest thereon being chargeable against the revenue of the year, but the cost of construction not being so charged. While, however, the outlay is sometimes debited to the ordinary expenditure of the year, it is difficult to exhibit clearly in the accounts the financial position of such works; and it has been, therefore, determined to introduce on the receipt side a new head of 'Debt incurred for Productive Public Works,' and one on the opposite side of 'Productive Public Works Capital Expenditure,' thereby clearly separating works constructed out of loans from those constructed wholly out of revenue." Forms of accounts were sent with that Despatch, and I undertook to prepare in the India Office Accounts according to those forms, and filled up from the best information available for the year 1875-76, a copy of which I have already laid before the Committee. In comparing that form with the Finance and Revenue Accounts of the Government of India, as submitted to Parliament in

Chairman—continued.

May 1877, the principal differences are that the whole capital outlay incurred for productive public works is included in the first general account of revenue and expenditure as a debt transferred for productive public works. The amount is 17,000,000 *l.* for irrigation, and 15,000,000 *l.* for State railways, making 32,000,000 *l.* altogether, which amount is reduced by transfer from the ordinary debt of India. The capital expenditure on productive public works is shown not under the ordinary income and expenditure of the Empire, but under "Debt." Then, in order to show the working of the return for the expenditure incurred upon public works in No. 1 of the subsidiary accounts, it will be observed that the enhancement of the land revenue assessed as due to the operation of irrigation works, is deducted from the main head of land revenue in the second line of the account, and is carried down to the return of revenue from productive public works, for irrigation, including collections with land revenue in the lower part of the account. And there also appears the income from the State railways and guaranteed railways. On the other side, in No. 2, the account of the ordinary expenditure, the interest on debt incurred and transferred for irrigation works is shown, and the working expenses and maintenance. The interest of the debt incurred for State railways is also shown, and their working expenses and maintenance. The guaranteed interest for the guaranteed railways, and the moiety of surplus profits and the Government expenditure, is also shown; so that at the foot of the general account on both sides appear, on the one hand, the revenue, and, on the other hand, the expenditure incurred for productive public works. Subsidiary accounts are given in the Paper which I have handed in, showing the amount of the debt incurred for public works, and the remaining debt chargeable to the ordinary revenues of India. The effect of this change is, that the public accounts will now show the results produced by the capital outlay on public works, both railways and irrigation works, which before could not be got from the accounts in any satisfactory way.

460. You have followed in this proposed system of account as nearly as possible, have you not, the Finance Accounts of the United Kingdom?—I have followed a form which was prepared in the India Office before my return from India, and I took that form exactly as it stood. What I undertook to do was merely to fill up the figures in that form, according to the latest information available.

461. Then we must not attribute the preparation of the form in part to you, but only the calculation of the figures?—Precisely so; the form was prepared, I believe, by General Strachey and Sir Thomas Seccombe under the instructions of Lord George Hamilton.

462. Going to subsidiary Account No. 1, and subsidiary Account No. 2, first I will ask you this question: No. 1 shows, does it not, the principal heads of Indian revenue, with this special novelty, that from the land revenue is deducted so much of it as is considered to be due to irrigation?—Yes.

463. And that item is reproduced in another line as irrigation revenue with the rest of the irrigation revenue?—Yes.

464. The other items on the revenue side are the ordinary items of revenue distributed in certain

Chairman—continued.

certain details?—In these respects it is an exact copy of the Account rendered to Parliament in the previously used form; and the only difference consists in separating the revenue from the productive public works from the other items of revenue with which it was mixed up before.

465. So that the ordinary items of receipt appear pretty much in their former form, barring that deduction from the land revenue, and the irrigation revenue includes that deduction?—Yes.

466. The State railways revenue is given in gross, the expenditure appearing on the other side, and the guaranteed railway revenue is given in net, the receipts less the working expenditure, and the guarantees appearing on the other side?—Yes; as to the question of the guaranteed railway revenue, I should explain that the original amount as submitted to Parliament was not entered at all in these subsidiary accounts, No. 1 and 2, but appeared in the general account in such a way that only the difference between the net traffic receipts and the guaranteed interest was shown.

467. Now the account, as amended, shows the net revenue from a company's point of view, the difference between the gross receipts and the working expenses?—Yes.

468. And that goes on the income side of the revenue of India?—Yes.

469. The guaranteed interest and the moiety of the excesses which is to be paid to the companies appearing in full on the expenditure side?—Yes.

470. What is the special difference which is not known to our English accounts; the subsidiary accounts, No. 1 and No. 2, are very similar to the accounts of the English Consolidated Revenue, are they not?—Yes.

471. It is intended, is it not, to include in each the real receipts and the real expenditure on income account?—Yes, and to separate the capital expenditure as a separate or debt account.

472. As it is separated in the English Treasury accounts?—Yes.

473. The distinction which has recently been made in the English accounts between the interest on debt created under ordinary circumstance and the interest on debt created for remunerative purposes being shown in the Indian account?—Yes.

474. You are aware, are you not, that within the last few years that that distinction has been made in the English accounts?—Yes.

475. And that the charge on the Consolidated Fund for the interest of debt raised for remunerative purposes, in fact, is shown as a separate item from the general charge on the English debt?—Yes.

476. And they have directly followed that in this account, and they distinguish the interest on the general debt of India, from the interest on the debt raised for irrigation and railway works?—Yes.

477. Then the general account to which the Income and the Expenditure Accounts are subsidiary is very similar, is it not, to the corresponding sheet in the English Finance Accounts, which gives the whole transactions of the Treasury, both as to income and expenditure, and also as to the debt of the various funds which

Chairman—continued.

the Treasury manages?—So I have understood, but I have not examined the English accounts very critically.

478. There is one item in this account which it would be well if you would explain; you enter on the debtor side of the general account the debt transferred for productive public works, as estimated, 17,000,000*l.* for irrigation, and 15,000,000*l.* for State railways; and, on the other side, there is a corresponding entry of 32,000,000*l.* debt for productive public works; I suppose after the year 1875–76 that entry will not appear; it only appears there because the amount has been estimated as the fair distribution of the debt?—Yes, it would appear only in the future in a subsidiary account. The rest of those sums in the list, namely, the amount transferred to debt for productive public works, is deducted from the amount chargeable to the general revenues.

479. But in future the general account would only express actual cash transactions, would it not?—Yes.

480. Not a mere book entry, but is that an estimate, for it is no more than an estimate of the probable amount of the debt due to productive public works raised in the past year?—Yes.

481. Assuming that that account is an account of actual cash transactions, and assuming that, *mutatis mutandis*, it is analogous to the general account of the English Treasury, is it your opinion that that sum fairly and properly describes the transactions of the Public Works Department as far as public works are concerned?—Yes; I think so.

482. Have you had an opportunity of criticising it with that view?—Yes, so far as the data available would enable me to do so.

483. You think, looking at it from a departmental point of view, and anxious that the departmental transactions should be fairly described, that account fairly describes them?—Yes, I think so.

484. So far, in your view, it is a great improvement upon the former form of accounts?—Yes; decidedly.

485. Do you anticipate that in bringing it into practical operation (because those figures are your own, I understand) there would be any great divergence between you and the finance authorities in India?—I think not.

486. Are they likely to accept that item for transfer of debt as practically a fair item?—I think so; and I have rather endeavoured to err against the Public Works Department than otherwise.

487. You think, provided that the same items appear on both sides of the account, inasmuch as it must be an estimate, it is not absolutely necessary that it should be very minutely accurate?—No; but we can give the actual figures so far as the capital outlay on public works is concerned; that is not an estimate.

488. The doubtful question being to what extent that capital outlay really was represented by borrowed money raised for that purpose?—Yes.

489. A considerable portion of the capital outlay on public works may, although it is extremely difficult from the form of the Indian accounts to certain it, have been derived from annual income?—Yes; but at the same time it is

Major Gen. *Dickens*, C.S.I.

14 March 1878.

Chairman—continued.

to be said that, on the other hand, if the expenditure on public works had not been incurred, the Government might have paid off a part of its original debt.

490. Then, at any rate, the Public Works Department have no objection to be charged with the full amount with interest on what you have spent upon those productive public works?—Certainly.

491. And if you have erred at all, you have been rather disposed to err against yourselves than in any other direction?—Yes.

492. Then we may take it, that from your point of view the change which Lord George Hamilton, the Chairman of this Committee, explained to Parliament last year, and which is carried out in this account, is a fair change, and, from an accountant's point of view, a proper change?—I think so.

493. You have had great experience, have you not, in connection with the Public Works Department Accounts?—Yes; before I was Secretary, I was for some time, in charge of the accounts of the department, and I had to work them.

494. So that you look upon the paper with an accountant's eye as well as an engineer's eye?—Yes, I have done so.

495. And you would be prepared to maintain against all comers the fairness of this system?—I think so on the whole.

496. Passing from the accounts, will you give the Committee a little more information about the public works establishments in India; how are the establishments of the Public Works Department now recruited and formed?—We have first the Royal Engineers serving in India, and there are a considerable number of military officers of the Staff Corps besides; but the chief strength of the engineer establishment now consists of Civil Engineers who have been sent out by the Secretary of State, more or less, since the year 1855. I find from a return which I hold in my hand that the number of Civil Engineers in 1856, was 70; in 1861, 120; in 1865, 251; in 1868, 400, and in 1869, 533. The total strength of the department is given in the Despatch which I am now quoting from. In 1870 the number of Royal Engineer officers was 237, other military officers 126, and Civil Engineers 533, making a total of 896. When I left India the total number in the employment of the Government was 1,150.

497. How many of those were Royal Engineers?—The proportion is about the same as I have quoted now, but I have not got the figures of the last return.

498. Has the effect of the establishment of the Cooper's Hill College reached its maximum yet to supply the full number that it was estimated to supply?—Nearly. It was calculated to supply 50, and I think supplies 42 or 43 yearly.

499. Will that supply practically keep the Public Works Department going in future?—Yes; but that depends a great deal upon the scale upon which the Government of India intend to prosecute those productive public works for the future. When I left India, there was a good deal of uncertainty about it. The famines had caused a great deal of expenditure, hence restrictions were placed on expenditure on public works, and the Government of India felt that

Chairman—continued.

they had more engineers for the moment than they required. If the works are resumed upon the same scale as previously, I think it probable that the number of engineers supplied by Cooper's Hill will not be more than is wanted.

500. You use the word "same scale," the same scale as when?—I believe I was just mentioning about 42 or 43 a year.

501. Do you think, if the public works were resumed on a greater scale than they are now, but on the same scale that they were some time ago, that from 42 to 50 will be insufficient?—No, I think that they will be sufficient for the present; but at present the supply is somewhat redundant.

502. Do you say that there are about 250 Royal Engineers employed at present out of 1,150?—Yes, about that number.

503. Is the charge for the Royal Engineers debited to public works, or is it debited to military expenditure?—It is debited to public works.

504. Including any estimate for retirement?—No; retirement is not charged to public works; that remains, I believe, a military charge.

505. Is that about the division of the staff, which is estimated for the future, one-fourth Royal Engineers and three-fourths civilians?—I think so.

Sir *George Campbell.*

506. Are there not a large proportion of those Royal Engineers local officers of the old company's service?—Yes.

507. The Royal Engineers, with the pay and establishment of the Royal Army, at present are employed in some of the provinces; but do you expect that under the present system 10 years hence there will be any necessity for as many as 250 Royal Engineers?—I think there will.

Chairman.

508. My question was, whether the proportion of Civil to Royal Engineers, was expected to be the same?—Yes; I mentioned in a former part of my evidence, that the engineers employed on military works had, by Lord Mayo, been formed into a separate branch of the department, and it is intended that they should be ultimately always Royal Engineer officers. In that way the greater part of the Royal Engineer Corps stationed in India would be employed on military works, and those who volunteered for civil works would perhaps be in a smaller number than at present taken for that service; so that on the whole I expect that the same proportion would be maintained as now.

509. That 1,150 employed on public works does not include, does it, those who are employed on military works?—Yes, it does include those.

510. Can you tell the Committee how many of the 1,150 may be deemed to be employed strictly upon civil public public works?—I think, probably, about 150 on military works, and the remainder on civil works.

511. Then, may we say that about 100 Royal Engineer officers would be employed on civil works proper, and 850 civilians?—Yes; possibly that is merely an estimate given without experience, but possibly that may represent the average.

Chairman—continued.

512. Do you include in that number those who are employed specially under the local Governments?—Yes, the whole, except some that are employed upon what are called local works, which are maintained by local boards, in fact not strictly Government servants. Those I have not included; all included are engineers belonging to the Imperial Government service.

513. When officers are employed upon works within the responsibility of the local Governments, how are they transferred to them; are they placed under the control of the Local Public Works Department?—Yes.

514. And do they cease to be under the control of the Government of India?—The Government of India reserves to itself the right of transferring them when necessary, but, as a rule, it is left to the local Governments, except that when the local Governments have once received an officer in that way they are supposed to retain him until the Government of India finds it convenient to transfer him to other duties.

515. Will you explain to the Committee what is the actual superintendence of these great public works, first of all, during their construction; in what manner are they superintended?—The department is divided into chief engineers, who are the heads of the department in each province; superintending engineers, who have the inspection of large districts; executive engineers, who have the immediate control of the money and detailed arrangements of the works, and who are assisted by assistant engineers, who take charge of individual works or sub-divisions. Besides those engineers there is a large staff of subordinates, partly European and partly native.

516. If you take one of the larger of the works which you have described to us, for instance, the Godavery work, upon which a good deal of money is now being expended, and upon which I think you said that you are in the course of spending 400,000*l.* or 500,000*l.* beyond the 700,000*l.* or 800,000*l.* that have been spent up to the present time; what is the method of superintendence of a work of that kind; who would be responsible, in the first instance, for the design, and then in whose charge would the work be put?—In a large work of that kind, perhaps not at present the Godavery work, because the expenditure is not very large now; but take any other of the canals, the Sirhind Canal in the Punjab, upon which we are spending about 200,000*l.* a year, there would be a superintending engineer in charge of the whole work, and he would be responsible for the design in all its details; the original design having previously been sanctioned by the Government of India, and approved by the higher authorities, he would be responsible for carrying out the work generally, according to the design. Then the operations would be divided into divisions; there would be one division for the head works, including the dam over the river, another division for the heavy cutting which has to take place for the main channel, and other divisions for the different branches; and over each of them would be an executive engineer, with the requisite number of assistants. The work would be partly done by petty contract, and partly by day labour. In the case of that land, I think, there is no general contractor, and in irrigation works generally the aid of general contractors, such as

Chairman—continued.

are employed in England, is not often introduced.

517. The number of contractors in India is nothing like the number in this country, is it?—The number of large contractors is much less; there is not sufficient competition to enable the Government to get contractors for work of that kind; but with regard to railways, we have generally been able to obtain good reliable contractors, and some of the works, such as the Rajpootana railway, was carried out by a European contractor.

518. Was the experience of contractors on the guaranteed railways satisfactory as a rule?—It was very various; sometimes it was satisfactory, and sometimes the reverse.

519. On the whole is it very much worse than in this country?—On the whole we prefer to get contractors whenever we can get reliable men, but we wish to be able to carry out works without them if necessary.

520. Is the Public Works Department so organised, and has it such an amount of experience, to enable it satisfactorily to control labour?—Yes, it has been in the habit of carrying out its own works without contractors for a long series of years. The contract system, so far as it is introduced, may be considered as of modern introduction. In the presidency towns, especially in Calcutta, work is carried out by contractors. There is in that case a sufficient number of contractors to enable the department to work entirely in that way, but when you go to the out districts it is not so easy to obtain them.

521. How low down is the superintendence of labour committed to the officials of the Government; would it be so low as an inspector?—Yes, quite, even down to the heads of gangs.

522. Are even the heads of gangs permanent Government servants?—No, they are temporary servants.

Mr. *Onslow.*

523. Are those heads of gangs all Europeans?—No, they are natives.

Chairman.

524. Is it your experience that by degrees the contract system may advance on these works in India, or must it for some time to come be the system for the Government only to employ petty contractors, or even to employ labour directly?—I think it will be a long time before the contract system becomes general; but as soon as sufficient competition amongst reliable firms can be brought about, it will be best to undertake works in that way.

525. Is it the established policy of the Public Works Department to substitute contract for the direct superintendence of labour as much as possible?—Yes, when it conveniently can be done.

526. Has not the Government facilities for purchasing material over contractors in India?—In some cases.

527. Speaking generally, have the officials of the Public Works Department knowledge which enables them to take the place of contractors for work of that kind?—Quite so. It is very often the duty of a Public Works officer to set himself down in a bare country and commence his work

Major Gen. *Dickens*, C.S.I.

14 March 1878.

Chairman—continued.

with the most rudimentary operations, such as making bricks and everything, under his own superintendence, perhaps entirely with natives, who are not well instructed in such matters; and he has, with the aid of his staff, to commence the whole thing from the very beginning.

528. Speaking from your own experience, you would say that, on the whole, the staff of the department is satisfactory from that point of view?—Yes, I think so. I think it is capable of improvement, and I hope it will go on improving.

529. Has it much improved in your time?—Yes, I think it has.

530. Since the number of civilian servants has been increased?—Yes; no doubt in former days very often we were obliged to employ officers from the army with very little experience, and the works may have suffered sometimes from that circumstance.

531. Were they Company's officers, or more recently officers of the Royal Army?—Not so much recently.

Mr. *Onslow.*

532. You say that those works suffered because you had to get officers from the military department who had had very little experience; but is it not the fact that works have suffered because the officer has not had time to make a personal supervision of the works, considering that he had to do office work as well, and really had not time in many cases to supervise works?—I think very often the establishments have been overworked, no doubt.

533. It is not so much the fault of the officers themselves as on account of the amount of work which the Government has put upon them?—Yes, you may say that, no doubt.

Chairman.

534. That being the general system of construction, when the works are finished, the works have to be managed by the Public Works Department, what is generally the organisation for maintenance?—It is very much in the same way; an executive engineer is put in charge, with the requisite number of assistants, and he manages all the transactions, supplies money on account, and arranges for supervision, together with maintenance and repairs; only the engineer would have a larger number or extent of works under his charge for maintenance than he would for construction on capital account.

535. To what extent is it necessary to refer locally from the officer on the spot to the central authority; is there a great deal of red tape in India on that matter?—I can hardly answer that question.

536. Is it necessary to refer for instructions in minute detail from the local officers, or is much responsibility left to them?—I think that a great deal of responsibility is left with the local officers, and more than would be under the English system.

537. Then, the impression which has prevailed that there is an enormous amount of detailed writing for instructions in respect of those works would hardly be a fair impression?—No, I think not; I think very often officers do write for detailed instructions when they need not do so.

538. Is that to get rid of responsibility, or under the impression that they are bound to do so?—Under the impression that they are bound to do so.

Chairman—continued.

539. Is it the policy of the Public Works Department to throw more responsibility upon their officers, or is it the tendency to require them to get more minute authority on points of detail?—I think of late the policy has been to throw more responsibility upon the officers, and to diminish the references to head-quarters. Complaints have been made, no doubt, about the accounts as being very burthensome upon the officers, but in India this is perhaps necessary, because it is difficult to provide the double staff, which you would require if you had responsible accountants in addition to the executive officers, so that we are obliged to employ inferior officers as accountants under the supervision and control of the chief executive authorities; and in that way the engineers have more to do with accounts perhaps than would otherwise be desirable.

540. But I suppose you do attach to every officer having the rank of superintendent an accountant officer, do you not?—Yes, we do; and we endeavour, especially where the works are concentrated, and such division of labour is possible, to employ an accountant of ability and large pay to relieve the executive officer as much as possible.

541. Would the accountant attached to a superintendent be a European?—Generally. Sometimes the natives are very clever accountants.

542. And trustworthy?—Yes.

543. There is a considerable staff of skilled accountants, is there not, in connection with the Public Works Department?—Yes. It has been growing up for many years. Colonel Chesney, who was for a long time our Accountant General, has the chief credit for the establishment of it.

544. We may take it as the policy of the department not only to add to the responsibility of the officers, and not to require them to refer in so much detail, but also to relieve them as much as possible of the accounts?—Yes.

545. Have you seen the good working of that policy?—Yes.

546. Would you wish it carried still further?—Yes, gradually, as opportunities occur.

Mr. *Onslow.*

547. Are you quite sure that the majority of the accountants attached to the executive officers are Europeans?—Not the majority attached to the executive officers; what I said was with regard to those attached to the superintending officers.

Sir *George Campbell.*

548. Are not the natives quite as skilled in accounts as Europeans, and quite as good?—I do not know that they are quite as trustworthy.

Chairman.

549. I should like to ask you, before I close your examination, one or two general questions about which probably we may ask in more detail some other witnesses, but upon which we should be glad to have your general opinion; looking to the works which you have described to us, both the railway works and the irrigation works, and speaking from your experience of the Public Works Department, is it your opinion that the policy

Chairman—continued.

policy which has been adopted has produced beneficial results upon the prosperity of the country served by those works?—Yes.

550. First of all, as to the increase of production, and as to the facility of inter-communication, taking the railways in the first instance, do you think it is palpable that great advantages have resulted from the Indian public works?—I think so. I think that the progress of the country has been very great of late years, and is due in a great measure to the public works.

551. You have been connected with the department, have you not, almost from the initiation of the railway system at any rate?—Yes.

552. Would it be your opinion that the advantages which were anticipated from the network of railways which has been carried out have been realised?—I think so fully.

553. You would say that there has been no disappointment, either financially or in the general interests of the country?—Not of late years.

554. There was a good deal of financial disappointment for some time, was there not?—Yes, for some time. Of course we had that Calcutta and South Eastern Railway which had to be taken over from the Company. It is the small railway extending from Calcutta to Port Canning.

555. Which did not pay its working expenses?—No, it was a guaranteed railway, and the Government had to take it over from the Company.

556. But looking to the network of railways generally, and putting aside for the moment the special income which has come from famine, should you say that the financial result up to the present time is as good as had been anticipated, so far as you are aware in your official capacity when that network was designed?—Yes. Of course some of the railways have not paid and are not expected to pay; but, on the whole, I think the result has been very satisfactory.

557. Speaking first of the guaranteed railways, that is your opinion?—Yes.

558. So far as you are aware, do you think that the development of the resources of the country, upon the lines of those railways, has been as great as was expected?—I think quite.

559. And in some particular respects, I suppose, even greater?—Yes.

560. The grain traffic, I presume, may be taken to have been developed to a greater degree than was anticipated?—Yes, of late years.

561. Irrespective of the special grain carried during the famine years, would you say that?—I think so.

562. There has been a development, has there not, in the export grain traffic?—Yes, that is quite recent.

563. Which was not thought of when the railway system was devised?—Not that I know of.

564. However, so far as railways are concerned, you, knowing the feelings of, at any rate, the department of the Government of India with which you are connected, would say that they have been a success?—Yes, on the whole, certainly.

565. Turning from that to irrigation works, should you say that the irrigation policy of the Government had been successful?—I think, on the whole, it has. There is a great difference in the different works in different parts of the country.

Chairman—continued.

566. It is a delicate question to ask you, but still I may do it in general terms; do you consider that the irrigation policy of the Government has been pushed forward as vigorously as the results from it show might have been justified?—I think so. I think it has been pushed forward as far as it was safe to push it, for it is not safe to push it beyond the rate at which we should get well worked out projects to go on upon.

567. Speaking from your own official experience, you are satisfied with the results of the irrigation policy as well as of the railway policy?—Yes.

568. Would you be prepared, from a financial and engineering point of view, to recommend any very great development of the irrigation policy?—I think that the best policy of the Government would be to go on with the works according as projects are presented to it, in a satisfactory form, to the extent of about a million and a half of outlay annually for irrigation.

569. You do not include in that million and a half outlay, the expenditure upon State railways?—No; I think that the Government could go on at that rate with very satisfactory results.

570. Is there any scheme in the records of the Public Works Department for a general development of the irrigation policy?—Yes; a scheme has been drawn out, and kept on record in the office, and has been submitted to the Governor General in Council on each occasion of projects coming forward, but it has not yet been sanctioned as a general scheme; it is rather retained as a means of keeping general considerations in view when projects come forward.

571. But the attention of the Department has been directed to the different districts in India, in which irrigation works might be profitable, and there is, you say, a scheme in existence to be gradually worked out in each of those districts?—A scheme is in existence, rather I should say for working up to the next four or five years; not a final scheme, but a scheme looking forward for a few years.

572. Have the different district officers been referred to from the Central Department for advice and information, as to to future irrigation works?—Yes, frequently.

573. For instance, in the different districts in Madras, have the officers been asked whether the tank system or the irrigation system might be carried further, and with what results?—Yes; reports have been called for by the Government of India, and the local governments reply, it is presumed, after communication with their own officers.

574. To state it in one sentence, there is an irrigation policy in the Public Works Department?—Yes.

575. Is it your opinion that that should be effectively kept up, so that from year to year the existing extent of the irrigation works should be steadily increased?—I think so.

576. But you do not think, I gather from what you have said, that any sudden and large extension of the works involving the borrowing of any considerable sum would be prudent?—No; I think that if it was resolved to proceed at a more rapid rate, it would be necessary to give some years before the increase of progress should

Major Gen. *Dickens*, C.S.I.

14 March 1878.

Chairman—continued.

take effect, in order to enable the Government to have projects properly elaborated.

577. Have you worked out in your own mind the experience which the present famines give as to the advantage of irrigation works, or rather as to the mischief from the want of them in the famine districts?—I think that the advantage of irrigation works in cases of famine depends entirely upon the security of the supply of water. If the supply of water can be relied upon in cases of failure of rains then, no doubt, irrigation is an almost complete remedy and preventive of famine. It enables the people to raise their crops, it prevents the drying-up of the forage for cattle, and in fact supplies the very thing which is wanted, that is water to the soil; but if the supply of water depends entirely upon the season's rainfall, of course in a severe famine the protection afforded by irrigation works comes to nothing. I believe that in this last famine the greater number of ordinary tanks in Madras remained dry throughout the whole time. Then, perhaps, I might go on to mention about the railways. The effect of railways as a means of communication on famine is quite different. If you construct railways, if you cover the country with railways, the drying-up of the soil goes on all the same; the crops cannot be raised, the forage for cattle is all burnt up, and the resources of the people are of course exhausted. The only thing that the railways do is to enable food to be carried to the people; and if the Government supplies them with the means of purchasing food, by employing them on relief work or otherwise, the railway enables the Government thus to save life, and if accompanied by proper measures of organisation, there is no doubt that life in cases of famine can always be preserved by an adequate system of railways and feeder roads; so that the question of irrigation or no irrigation is not a matter of life and death, as it has sometimes been said to be. The question is of the most efficient and economical way of averting those calamities. The expense in such cases is not merely a matter of actual capital outlay at the time, but of the outlay being remunerative or not remunerative. If the expenditure on railways for instance, was sure to give a return irrespective of famines, then you might say that the railways would save life in famines almost without expense, or entirely without expense as regards the railway itself, because it would pay its working expenses, and interest, from the ordinary traffic, and in time of famine it would only be necessary to supply the people with the grain, or with work to enable them to purchase the grain, in order to avert starvation. It might be cheaper, therefore, to incur large expense upon railways, even though it be necessary to have recourse to further expense, to supplement it in the way of famine works or food to the people than to undertake irrigation works even if you could secure a permanent supply of water, if your supply of water cost a very large sum, and was, in fact, a more expensive method of saving the country than railways would be.

578. In considering the question of irrigation works as a remedy for famine, India should be divided into two great regions, one the region extending along the Himalaya and down to Kurrachee, which region is all within reach of an unfailing supply of water from the Himalayan snows, and the rivers fed from them; the other is the central and southern region, which is out of reach of any such supply, and depends for its water upon the rain which falls upon the plains, and runs mostly from west to east. In the northern region, commencing at the western end, we have a country which is very dry, almost rainless, and in which irrigation is sure to be useful in producing crops, but in which there is a very scanty population; and therefore we have here simple works, such as the inundation canals. A little further to the east, as from Lahore to Delhi, or Cawnpore, we have a country which is still very dry, although not so dry as the other, and which has a considerable population. Over this country we have already in hand, or constructed, the irrigation works which are shown by the great green plot on the map, so that when those works are completed that country will be tolerably well protected from famine. Then again, in Rohilkund, Oudh, Benares, and North Behar, we have a country which is very populous, but which is more moist; the water is in the greater part of it pretty near the surface, and although it is unquestionable that irrigation works would be of use in dry years, it is doubtful whether in years of ordinary plenty there will be sufficient demand for the water to make the works pay. In that country at present we have not commenced any irrigation works. Projects have been sent forward, but they have not yet been considered sufficiently satisfactory to be sanctioned. From the eastward of this, again, we come to regions which are generally moist, and so moist as certainly not in ordinary seasons to require irrigation; but in an exceptional famine year such works might be useful, but they certainly would not pay. The remainder of India is a large central elevated plain, and the only permanent source of supply to irrigation works would be reservoirs such as could retain the water for more than one season, and, therefore, be useful in the case of the total failure of rains. There would be large reservoirs, such as the Moota Moota scheme which I mentioned, near Poona. Such works are generally very expensive, and in most cases it is very doubtful whether they would pay as investments of capital; it depends very much upon local circumstances; and I think what we have to do is to seek out favourable sites for them and make use of them as far as we can; but for the most part for that tract of country we must depend upon railways in cases of very severe famine; and the ordinary tanks and other irrigation works from the rivers would be useful in years of moderate drought, when the water supply does not entirely fail, for then such works enable us to catch a sufficient proportion of the rain to save a large part of the crops.

579. Then your view would be that we must put out of our consideration the valley of the Ganges and the Indus, and generally the north of India, as fairly provided for?—Yes; a gradual extension will be wanted, and I think that the projects which have hitherto been held in abeyance in Rohilkund, Oudh, Benares, and Northern Behar, may some day be brought to such a shape as they can be carried out without undue expense, and with great advantage.

580. What I meant was, that the irrigation policy

Chairman—continued.

policy of the Government of India deals sufficiently with those districts, both the moist districts to the east and the rainless districts on the Indus, of which you have described the works in progress?—Yes.

581. But that when you come to Central India, and more to the south, in your opinion, except here and there, where a two years' supply can be got, no irrigation system will really be available against famine?—Against severe famine. I think where the drought is partial, so that there is a supply of rain which would be insufficient without irrigation works, the irrigation works will enable crops to be raised.

582. Then we must look to the action of railways as the best means for averting the consequences of severe drought by meeting the necessity when it arises?—Yes, I think so.

583. Are not those precisely the parts of India where the railways are least likely to be remunerative?—They are not so rich as the valley of the Ganges, certainly.

584. But they are intersected with certain railways between given points which may pay?—Yes.

585. But any considerable extension of the railway system in the centre and south centre of India is not likely to pay a very good percentage?—We have got a very large system of railways already established in the southern part of India. In the south centre we have lately constructed a line from Hydrabad, and there has long been a project for a line from the port of Carwar through the cotton country.

586. But my question points rather to this; in that great triangle between the three capitals, Bombay, Madras, and Calcutta, which is just the district where irrigation works are least likely to be the prevention of a severe calamity like famine, is it not the case that railways are the least likely to be remunerative?—I think large elaborate railways would be; but I think cheap lines, narrow-gauge lines, would probably be found to pay.

587. Would it be your policy to push forward in those great districts of central India a system of cheap narrow-gauged lines?—Yes, to the extent to which they would be likely to pay, in the first instance, certainly.

588. And even beyond that extent where they would be from time to time a palliative of famine?—I think that wherever a famine was likely to be very severe, owing to the population being considerable, you would find that railways would pay if constructed cheaply and judiciously.

589. Have you entered minutely into that question of cheap railways; do you think that, except in a mountainous country, the narrow-gauge railway is cheaper than the ordinary gauge?—Yes.

590. Appreciably cheaper?—That is my opinion; but I know that it is a subject upon which there is very great diversity of opinion.

591. You remember the great controversy a few years ago in India about that subject?—Yes.

592. From your own engineering experience and knowledge, you do point to the large extension of cheap narrow-gauged railways quite irrespective of their undoubted advantage in mountainous and canon countries, as they are termed?—Yes, I think they are quite sufficient to carry the traffic which we require in most parts, and we have evidence of that in our Rajpootana railway.

Chairman—continued.

593. To what extent would you like to see State railways carried out?—To about 3,000,000*l.* year.

594. So that your policy would be to devote about 4½ millions a year of borrowed money to irrigation and State railways?—Yes; that was the amount which was fixed by Lord Northbrook just before the famine of 1873, but the financial difficulties which occurred after that, rendered it necessary to reduce it somewhat; but I think 4½ millions is what we are in a position to go on with, and is sufficient to develope the country at present.

595. That is adding to the debt interest, probably a charge of about 180,000*l.* a year?—Yes. The gross growth of revenue from the works which we have, would be sufficient to enable that to be carried out without any increased burden to the country.

596. That is a result, not of a casual or limited study, but a careful study on your part?—Yes; and the result of consideration for a great many years in conducting the business of the department.

597. Has that estimate recently, before you left, received the consideration of the superior authorities in India?—I think they were generally favourable to it; but there was so much disturbance owing to the famine, and so forth, that I do not know that I can say positively that anyone had fixed upon any exact sum.

598. In spite of the temporary disturbance of your financial estimates which has taken place lately, you adhere to that view?—I think so.

599. And you would like to see that laid down as the standing policy of the Government of India?—Yes; subject, of course, to alteration from time to time as circumstances might induce the authorities to advise.

600. Do you consider that the Public Works Department could prepare a scheme of work for some years in advance, up to which they should operate in carrying out such a policy?—Yes, certainly; I think it would be a very good thing as regards economy of execution that a certain sum should be fixed upon not liable to fluctuation from year to year.

601. And that a scheme should be prepared in the first instance, and worked up to?—Yes.

602. That, I think, you told us with respect to the guaranteed railways, had not been very thoroughly done in past years, but it is your view that looking forward is an essential part of a good system of administration?—I think so; that a scheme should be laid down and extended and modified from year to year, and worked up to in that way.

603. But still studied very carefully in the first instance, so as to found something like a sound basis?—Yes.

Sir *George Campbell.*

604. I would like to ask you a general question; at various times papers have been put forward by the Government of India, in the Public Works Department, stating both the results of past public works, and forecasts for the future; one of those has been circulated among the Committee, which I hold in my hand, dated Simla, the 18th of July 1873, "Forecast of Expenditure

Major Gen. *Dickens*, C.S.I.

14 March 1878.

Sir *George Campbell*—continued.

from Loan Funds on Railways and Irrigation Works"; I observe that those statements are issued by the Government of India in the Public Works Department, and are signed by an officer of the Public Works Department; and what I want to ask you is, whether in the Government of India there is any system by which those statements, which are drawn up by the Public Works Department, are subjected to the criticism of the financial, or any other department?—Yes, those statements are referred to the Financial Department, and approved by them before they are published.

605. Is it habitually the case, that statements of this kind are approved by the Financial Department before they are sent out?—There are only two of those statements that have ever been issued, the one in 1873 and the other in 1875, and they were both considered in the Financial Department.

606. Are the annual statements which are published, as regards the profits of the canal and the result of public works of that kind, transmitted to the Financial Department?—Yes, always.

607. Are they countersigned in any way by the Financial Department?—They are not; they receive the concurrence of the Financial Department so far that they do not object to them. I do not think that they make themselves responsible for each statement; but in the case of those forecasts, they fully examined and accepted them.

608. As regards the annual statement, would it be open to the officers of the Financial Department of the Government of India to say we think that this and that statement are open to considerable modification, and that so much cannot be drained by the Public Works Department?—Yes; they are referred to the Financial Department.

609. I suppose so far they pass them, but would it not now be open to them to say we object to this or that item, as claiming too much for the Public Works Department?—I suppose it would be open to say so. I do not think that they have bound themselves not to do so.

610. You are aware, are you not, that there is in India a Public Works Loan Act, under which loans are advanced, and may be advanced to almost any extent, to local governments, municipalities, and individuals, for public works?—Yes.

611. Is that a matter within your cognizance, and can you give us any information upon that subject?—When such cases come before the Financial Department, they generally have referred them to the Public Works Department to report upon them before they have granted the loan.

612. Is that the case as regards all works, small and great, for the prosecution of which a loan is applied for?—I think not altogether. They generally have done so, but I do not think they have done it in every case.

613. Do you know how those loans to municipalities and local bodies are adjusted in the accounts of the Government of India?—No.

614. You are aware, are you not, that it is an essential condition of those loans to municipalities that there should be a sinking fund for the redemption of those loans?—I believe that is the case.

Sir *George Campbell*—continued.

615. Do you not think that the same principle of a sinking fund for the redemption of loans might properly be applied, and ought to be applied, to those works which are made from a loan of money by the Government of India?—It might be done, but I hardly think it necessary.

616. Up to the present time there has been no sinking fund, has there?—No.

617. But you think that, taking those works as a whole, there might be a system under which a sinking fund might be provided in addition to the interest which is charged upon those works?—Yes, I think that might be done; at the same time I think if the system of forecast is carried out, it would not be necessary to go further.

618. Do not you think, looking at the possible changes in the country, and the possible deterioration of those works, it would be right and proper when this account is made out, to charge something in the nature of a sinking fund, in addition to the simple interest?—I think, in a large concern of that sort, it is hardly necessary. Just as a large company has its own insurance fund, so I think the Government might trust to the general results of those works without establishing a sinking fund.

619. Will you tell me what is the nature of the insurance fund; supposing, for instance, that a very large amount was expended in a great anicut or weir over a river, which might last 20 or 30 years, that anicut being swept away, how could it be replaced if you had no sinking fund?—I think that the income of the works would stand that.

620. Then, in that case must we not deduct something from the income in estimating the profits?—Yes; but spread over a large number of works, that would not come to much,

621. With regard to the works other than irrigation works, was not the Calcutta Port Trust established six or seven years ago?—Yes.

622. That was established upon the system of Municipal Loans with a sinking fund, was it not?—Yes.

623. Are you aware that up to this time that Calcutta Port Trust has been very successful, that it has paid its way completely, and that the harbour has been improved, without any financial loss whatever?—Yes, it has been very successfully done. About the work, I am not so sure. Sir Andrew Clark latterly expressed some doubts as to the success of the work in an engineering point of view; and I do not think that he had satisfied himself at the time that I left India; but financially they have been very successful.

624. There was the case of the floating bridge over the Hoogly, on which a very large sum of money, some 200,000 *l.* was expended; that sum being advanced to the Government of Bengal by the Government of India, can you tell us how that money was adjusted in the account?—I think it was kept as a separate concern, much the same as a corporation or trust.

625. The money was expended from the "Extraordinary," was it not?—No, it was treated as local.

626. Then there were the Elphinstone works at Bombay, which were taken over by the Government at a high price; do you remember how much money was expended upon those works?—It

Sir *George Campbell*—continued.

It was a very large sum; I think about a million and three quarters,

627. Were those works completed as a trust?—Yes, they have been carried on under a trust.

628. Can you tell us whether they have been successful?—Yes, at present they are; but I think the local authorities are rather doubtful whether they will pay.

629. Can you tell us how the account is adjusted with reference to those works?—I think the works will pay eventually.

630. But in the meantime is there an account showing the loss?—A capital account is kept by the trust, I believe.

Mr. *Onslow.*

631. When you say that they have paid, do you mean paid working expenses or paid the interest?—Interest and working expenses.

Mr. *Fawcett.*

632. Do they pay anything more than their working expenses?—I believe they do, but the works are not yet finished.

Sir *George Campbell.*

633. As regards the Madras Harbour, has any trust been created for the execution of the works for the Madras Harbour, or are they carried on directly by the Government?—It had not been created when I left India, but the Government of the day had expressed their intention of creating a trust, and the Madras Government were about to introduce the necessary legislative enactment in their Council.

634. But several years have elapsed, have they not, and the Madras Government have not done anything of the kind?—About two years.

635. A good deal of money has already been expended upon that work, has there not?—Yes.

636. Have you personally any confidence that the interest upon that money will really be received by the Government of India?—I think it is open to doubt.

637. With regard to the question of railways, is it not the case that Lord Dalhousie did design a great system of trunk railways which has been gradually worked up to?—I said in my answer to Question No. 68 that I should like to refresh my memory upon that point. I find that that system was worked out more completely than I supposed when I first answered the question. Lord Dalhousie proposed "That the Trunk Line in the Presidency of Bengal should be carried up the valley of the Ganges to Allahabad, and thence up the Doab to Agra and Delhi, with a view to its being extended through the Punjaub westward as soon as its construction may be found practicable, and that the line to Diamond Harbour should be rejected; that a junction line should be formed between the above-mentioned trunk line and the Presidency of Bombay, either by the valley of the Nerbudda or by way of Baroda and Neemuch, but preferably by the latter in the first instance, if further examination should recommend it." That junction line has been carried out by the valley of the Nerbudda. A line from Baroda is now being extended by Ahmedabad to Ajmere, and also from Indore to Ajmere. "That a line should be formed in the Presidency of Madras by Menil (to which point it has already been sanctioned) by Vellore, Vaniembuddy, Coimbatore, and thence to the western coast, with a branch to Bangalore" (that has also been done), "and a branch also to the foot of the hills towards Ootacamund; That another line should be constructed in the Presidency of Madras, from that city, by Cuddapah to Bellary, and that surveys, &c. should be made with a view to its extension across the table land to Poonah, in the Presidency of Bombay, in order thereby to form a junction with the western coast." Instead of being carried from Bellary to Poonah it has been carried from Ranchore junction. That is Lord Dalhousie's scheme.

Sir *George Campbell*—continued.

Major Gen. *Dickens*, C.S.I.

14 March 1878.

638. May I say, speaking broadly, that Lord Dalhousie's scheme has been carried out, and now forms the backbone of the railway system of India, and has been successful?—Quite so.

639. I think you said that, speaking broadly, the main lines of railway constructed in India have been successful, but that some have been unsuccessful, and you particularly mentioned the Calcutta and South Eastern or Port Canning Railway as having been specially unsuccessful; will you be good enough to tell us the circumstances under which the Government were induced to make that railway, or rather to guarantee the making of that railway, and eventually to purchase it?—If I remember rightly, that was done in England, without the approval of the Government of India.

640. Was it not the case that an influential private company, called the Port Canning Company, was very much interested in getting that railway made?—I believe so.

641. Were not large concessions made to that company in respect of land in the Soonderbunds, and so on?—Yes, I believe so; but I was not in the office at that time, I merely know from common report.

642. Is it not the case that the circumstances of India are such, more especially in connection with this country, and especially with the City of London, that very great pressure is habitually put upon the Government to take over all schemes that do not pay?—I cannot say that generally.

643. There are some cases of that kind, are there not?—Yes; the Calcutta and South Eastern Railway was one, certainly.

644. Is it not the case that there were several instances in which the Government was induced to make small railways in connection with the enterprises of companies which did not pay?—There were three or four feeder lines to the Great Indian Peninsula which were undertaken by the Government, and which have not paid at present.

645. Are you aware that there is a company called the Nerbudda Coal Company?—Yes.

646. Were not large concessions of coal ground made to that company upon the undertaking that the company would not only work the coal, but would also work the iron which the country contained, and would produce within a given time some stipulated quantities of iron?—Yes; I think that was in their agreement.

647. Did they ever fulfil their agreement?—No; not as regards the iron.

648. Did they bring their own coal to market, or did they insist that the Government should make

Major Gen. *Dickens*, C.S.I.

14 March 1878.

Sir *George Campbell*—continued.

make a railway which should bring their coal to market?—I think a branch was made.

649. Was not that done by the Government?—Yes, I think so.

650. Has it paid the Government?—That I cannot say.

651. I think you said generally that there were two or three branches of that kind made by the Government which have not paid?—Yes.

652. And one of them was to Oomrawattee, was it not?—Yes.

653. Can you tell us the conditions under which a small line from Muttrae to Hatteras was made by the Government of the North Western Provinces?—It was undertaken by the North Western Government on capital locally raised, that is to say, some of the native merchants subscribed a part of the capital, and the Government supplemented that by taking a share in its own hands, and the works have been carried out and have been very successful. It is a line about 30 miles long, but it has been laid mainly upon the side of the road, and carried out at an expense of about 3,000*l.* a mile.

654. Was the money, which was advanced by the Government, advanced as a loan under the Municipal Loan Act?—I am not quite sure, or whether it was advanced by the Government of the North Western Provinces as provincial expenditure.

Thursday, 21st March 1878.

MEMBERS PRESENT:

Mr. Agnew.	Mr. Fawcett.
Mr. Balfour.	Lord George Hamilton.
Sir George Campbell.	Mr. Hardcastle.
Mr. Childers.	Mr. Sampson Lloyd.
Mr. John Cross.	Mr. Mulholland.
Mr. Grant Duff.	Mr. Onslow.

LORD GEORGE HAMILTON, IN THE CHAIR.

Major General C. H. DICKENS, C.S.I., called in; and further Examined.

Sir *George Campbell.*

655. I ASKED you one or two questions about the Madras Harbour the other day. I should like to ask you again; have you any reason to believe that the estimate for that harbour is likely to be very much exceeded before the harbour is completed, and is there any foundation for the statement in the newspapers that Sir Andrew Clarke has expressed an opinion that, whereas, the estimate was for 56 lacs, the people of Madras will be lucky if they can complete it for 150 lacs?—I know Sir Andrew Clarke was dissatisfied both with the design and with the estimate for the harbour, but I have no information as to precise details, and I find that no report of such has been received at the India Office.

656. Can you give us any figures showing the returns from the Elphinstone Harbour Works up to this time, and the loss which the Government has incurred?—It is called the Bombay Port Trust, including the new dock. The latest information that I have seen is in an extract from the "Times of India" newspaper, which I have procured at the India Office, dated the 11th of July 1876, in which Colonel Ballard, the chairman, publishes his report, and he states, "The general result of the administration of the affairs of the Port Trust during the year ending the 1st of April last, has been very satisfactory. The revenue shows a large increase, and only fails to meet the expenditure by 36,455 rupees, or less than 3 per cent. of the whole."

657. But do you understand that to be the expenditure, including the interest upon the capital due to the Government, or is it merely upon the working expenses?—He goes on to say, "As the expenditure is chiefly on account of the payment to Government of interest on the purchase-money of the Elphinstone estate, it is liable to little fluctuation."

Chairman.

658. There is a sinking fund added to the interest, is there not?—I am not quite sure that there is in that case; I think Colonel Ballard's statement refers merely to the interest on the capital account of the trust as contained in the Schedule to the Act, which was 258 lacs and odd of rupees.

Chairman—continued.

Sir *George Campbell.*

659. Could you give the Committee very briefly some account of the history of the Upper Godavery Works, the circumstances under which they were designed, the nature of the works proposed, their cost, and the result in the shape of either pecuniary return or increased traffic?—The works for the navigation of the Upper Godavery were designed many years ago. I do not recollect the exact date, but it was, I think, about 1855 or 1856 by Sir Arthur Cotton, I believe, and Colonel Haig. The original estimate, to the best of my recollection, was 300.000 *l.*; but, after carrying on the works for some years, it was found that to complete the works at all the three barriers would come to a very large sum; and in 1871 or 1872, the Government of India, with the sanction of the Secretary of State, resolved to stop the works. At that time about 700,000 *l.* had been expended. The works to the first barrier were completed on a reduced scale, so as to be open for navigation for four months of the year. The latest information that we have of the traffic and its value is the report of 1873, at which time the report for the year 1872-3 was, that 579 boats had passed up and a large quantity of timber had passed down, and the total value of the imports and exports was reported to be about 24,000 *l.*

660. Has the second barrier ever been completed?—No; the works were only begun and never completed.

661. Up to what point is the river now navigable?—Above the first barrier up to the foot of the second barrier.

662. And that only for four months in the year?—I think the locks have only water enough in the channel for four months in the year.

663. Is it not the case that the second barrier is a more difficult work than the first barrier, and that the third barrier is infinitely more difficult than either the first or the second; but inasmuch as only the first barrier has been completed upon a reduced scale, we may say that the expenditure

Major Gen. *Dickens*, C.S.I.

21 March 1878.

Sir *George Campbell*—continued.

of 700,000 *l.* has resulted in the completion of a comparatively small part of the original design?—Certainly. At the same time the work has been stopped with some of the works of the second barrier unfinished.

664. Such traffic as there is is now confined to the lower part of the river and to the traffic which may be produced by the Nizam country, is it not?—I believe it is principally.

665. Is there any prospect that a considerable traffic may be developed from Hyderabad and the country between Hyderabad and the first barrier?—I have got the report here of Mr. Saunders, the Resident at Hyderabad, dated the 2nd November 1874, in which he says: "For my part, I have no doubt as to the great and substantial benefits which the opening of the Godavery river has already conferred, and will yet more confer upon his highness' territories upon the right bank."

666. I will take you to the railway rates charged during the late famine in Madras and Bombay; I think I understood you to say that during the famine, or at all events during the early part of the famine, the railway rates were not reduced?—No, the railway rates were reduced, I believe, independently of the famine, but shortly before the famine occurred, with the view of fostering the grain traffic.

667. But there was no special reduction on account of the famine?—No, not so far as I have ascertained. The rates, I may say, for a ton of grain per mile on the East Indian Railway, were something over $\frac{1}{2}$ *d.*, and on the Madras and Bombay lines about 1 *d.*

668. No advantage was taken of the great demand for railway carriage at the time of the famine to enhance those rates?—No.

669. Was it not a result of the rates being maintained at their normal level, that the demand for the transport of grain by traders proposing to take advantage of the famine, became so excessive, that it was impossible to satisfy the demands of all the traders who wished to send their grain by railway; and that there was a difficulty in allotting waggons among the different competitors for the carriage?—I understood that there was a difficulty in allotting carriage, the demand was greater than could be supplied; but the system adopted was to give the preference to the grain traffic, and to supply the first comers first.

670. Was not the result of this excessive competition for railway carriage on the part of many traders who could not be satisfied, especially on the Madras Railway, that the allotment of waggons acquired a large value?—I have not been able to find any information upon that point; nothing of the kind was reported in the Public Works Department at the time I left India, and I have ascertained from Mr. Danvers, the Director of the Government railways, that he is not aware of anything of that sort.

671. Your attention has not been called to some statements in the Madras papers, that those railway allotments were openly sold in the market for a large sum by the parties to whom they were assigned?—No.

672. Have you had any occasion to compare the rates at which grain was sold at Madras at one end of the railway, and in the famine districts at the other?—I have not; I was not in India during the prevalence of the famine.

Sir *George Campbell*—continued.

673. You do not know whether that difference in price largely exceeded the mere cost of railway carriage?—No, I do not know that.

674. With regard to the Western Jumna Canal, is it not the case that water is not thrown into that canal by artificial permanent head works at the head of the river, and that the greater part of the upper channel is what I may call a semi-natural channel, with regard to which it may be said that it is to this day uncertain whether it is an old excavated channel or a natural river channel?—I believe that is the case; I should mention, however, that a permanent dam has been sanctioned, and is now in progress.

675. Is it not the case that up to this time the use of the Western Jumna Canal has been obtained by very temporary and cheap works, by which the water was thrown into this semi-natural channel, and has been distributed in a somewhat imperfect and unregulated manner?—Yes, to some extent; but I should not use a term so strong as imperfect or unregulated.

676. Then the interest which you have stated to be returned by the working of this canal, is interest calculated upon the comparatively small sum which was expended on utilising this old work, which I have described as a semi-natural channel?—No, that is not the case; I explained in my first day's evidence, that the value of the old works now in use, was comparatively small, and certainly under 100,000 *l.*, whereas the capital outlay by the British Government is about 433,000 *l.*

677. Still it is the case, is it not, that the result of that capital has been very imperfect works, and that in consequence of the imperfection of those works and the evils which have resulted, both with regard to the deterioration of the country and the health of the inhabitants, it has now been found necessary to expend a very large sum on those works, in order to render them safe and efficient, although no considerable increase of revenue is likely to result from that large additional expenditure?—Yes, it has been deemed desirable to incur a large expenditure in remodelling the canal; and when the works are completed probably the return will be reduced to about 10 or 12 per cent.

678. At present it is the case, is it not, that in calculating the value of the canals of northern India, the large per-centage hitherto assumed to have been yielded by the present Jumna Canals has been thrown in with the others, and counterbalances several smaller canals, in respect of which no profit, or a less profit, has been obtained?—To some extent it is.

679. There are, I think, some canals in the North Western Provinces on which there has been little or no profit?—The whole of the canals are included in the list in the revised account, which I have submitted to the Committee. I have already gone over the works in the North Western Provinces in some detail.

680. I should like to ask you about the Soane Canal; it is the fact, is it not, that the works were so far ready in the year 1873 and the beginning of 1874, that it was possible to irrigate a good deal of country by water, which was given free to the cultivators, and by which great benefit was received during the famine which prevailed during that time?—Yes; I have stated that already in my former examination.

681. That was fully four years ago; and is it not

Sir *Goorge Campbell*—continued.

not the case that the works having been in that state of progress four years ago, and having further advanced since, there are considerable portions of the country which can be reached by the water of the canal, and in respect of which the canal might operate to a very considerable extent, if the zemindars and the cultivators were willing to take the water?—Yes; in the last return that I have seen, I think about 37,000 acres were actually irrigated.

682. Has not the result, up to this time, been considerably disappointing, and is it not the case that those people, who were so much benefited by the water in 1873-74, and who were quite ready to take it when they got it for nothing, have shown a very great indisposition to take it, even at the very moderate price which has been offered to them, I think of one rupee an acre?—I do not know the details of the prices; but I believe the growth of the revenue has not been quite so rapid as was expected.

683. Have you any information which would enable you to give an opinion as to why the growth has been so little rapid on the Soane Canal?—I think it is a part of the usual history of irrigation works, that it takes a long time at first to get the people to take the water, where they were not accustomed to pay for it previously.

684. Are you aware of any special difficulties which have been experienced on the Soane Canal with regard to the tenure of land, or anything of that sort?—No.

685. With respect to the Orissa Canal, can you give us, from your own knowledge, a short account of its origin?—I have done so already. I think you will find that in my previous evidence.

686. I think you said that the Government assumed, that in buying the canal, it was worth the money given for it. Do you mean to say that the Government believed that the work represented the money expended upon it; is that all you meant to say, or do you mean to say that the Government believed that they were taking over a concern which was likely to pay them commercially?—I referred to the value of the works. The Government at the time they took over the concern were not satisfied that they would receive a return for the money, but at a subsequent date they did become satisfied that they would do so, and they have again been disappointed.

687. Can you now tell the Committee the views by which the Government were influenced in taking over this work which they were aware was not likely to pay them commercially?—I think it may be said generally to be the complication which arose by the necessary interference of the company's arrangements with the Land Revenue arrangements.

688. With regard to that canal, I find that you told us generally that this work was designed by the Irrigation Company, but what I want to ask you is, if you can tell us anything of the origin of that company; whose idea was the Orissa irrigation scheme; with whom did it originate, and how did it originate, and how did the company come into being, and how did they obtain this concession?—I do not think I could answer that question without refreshing my memory, but I may say generally that at that time the Government of India, feeling that it would be difficult to carry on works by its own resources, endeavoured to get companies to undertake them, and this was one of the first companies that came forward.

Sir *George Campbell*—continued.

Major Gen. *Dickens*, C.S.I.

21 March 1878.

689. But you cannot tell us whose design it was to select this part of the country as a promising field for irrigations?—I believe it originated with Sir Arthur Cotton, but I cannot say positively.

690. Do you happen to know anything about the mode in which the 50,000 *l.* allowed to the company for establishment was disposed of?—No.

691. I should like to ask you whether you have any knowledge of the very gigantic schemes for reservoirs which have been propounded by Sir Arthur Cotton?—I have merely seen them mentioned in the newspapers; I have not examined them.

692. Have they not come officially before you?—No. There is one in the Mysore territority, the Maaree Conway tank, which I remember came up many years ago, but it has not been brought forward again very lately; at least not in my time.

693. Do not you recollect with regard to the Upper Godavery works when it was discovered that there was no water in the river for eight months in the year, and a great deal too much for four months, that Sir Arthur Cotton placed before the Government a very large scheme, by which the excessive water of that four months might be stored up and let down gradually in the eight months?—Yes; I think something of that sort did come forward, but I do not remember the details.

694. Do you remember whether an inquiry was made, and engineers from Madras were sent to determine whether they could reduce a project of that kind to practicable shape?—Yes; I think some inquiry was made at the time, which came to nothing, but I have no details.

695. Do you know anything whatever of a project, which has lately been put forward by Sir Arthur Cotton, for establishing a grand reservoir 1,600 feet above the sea, by which all India is to be irrigated?—No.

696. I should like to ask you this, with reference to canals, of which you have a large personal experience, is it not the case that the navigation upon those canals has been very disappointing, and has there not been a very considerable difference of opinion between the Madras school of engineers, headed by Sir Arthur Cotton, and the engineers who are responsible for those works, with reference to the question whether navigation should not have been more largely developed upon them; can yon tell us why, in your opinion, there has been so little navigation?—I think the question affects chiefly the Ganges Canal, on which there were difficulties of navigation on account of the rapidity of the current of the canal as first constructed. Improvements have since been effected, and are being effected, to get rid of this difficulty, and the navigation has no doubt to some extent increased, but the increase from this source does not amount to anything at all considerable in the revenues of the canal.

697. Is there any very considerable or very paying navigation upon any of the canals in Northern India?—No, none.

698. Then, do you attribute that want of navigation

Major Gen. *Dickens*, C.S.I.

21 March 1878.

Sir *George Campbell*—continued.

navigation to faults in the canals, or to the superior cheapness and facility of railway transit?—I think the navigation will grow ultimately, especially as canals are opened to communicate with each other, but I do not expect that we shall derive any very large revenue from them.

699. I should like to understand whether any part of the money expended upon irrigation tanks in Madras is charged to extraordinary?—I think only in a few cases, which I mentioned in my former evidence in giving the details of the extraordinary expenditure, but ordinary tank expenditure is not charged.

Chairman.

700. Do you include in the return which is in the possession of the Committee all the irrigation works in Madras which have been constructed with borrowed money?—Yes, all of them have been included in this return of the Finance and Revenue Accounts as "extraordinary" works; it is merely the translation of those accounts into a new form.

Sir *George Campbell.*

701. Have you any knowledge of the system upon which those tanks in Madras are managed, whether they are exclusively managed by the Government and kept up by hired labour, or whether any obligation rests upon the villagers to keep them up?—I believe there are tanks in Madras which are kept up by the villagers, and they call them zemindary tanks; but I do not know the details of the Madras system intimately, and I think the Committee will have an opportunity of examining other witnesses who know better than I do.

702. I think I asked you the other day as regards the existence over a large part of India, of tanks which are maintained by the natives themselves; I especially alluded to the Central Provinces; I think you served in the Central Provinces; have you any knowledge of the tank system which is very successfully carried out in one part of the Central Provinces?—I was not long in the Central Provinces, and I did not during the time go about to those parts of the country, so that I have no personal knowledge of them.

703. Can you explain to us what is the system under which the canal revenue is collected in the North Western Provinces; I mean, does the Government as the owner of the canals, deal with each individual cultivator, or is there a system under which the Government is enabled to deal with the villages collectively, or possibly with the large proprietors on the part of any cultivators under them?—I believe the Government deals with the villages chiefly through the village officers.

704. Now I come to the account, which has been lately devised for showing the outlay and the profits of public works; is it not the case that so long as there was a very heavy loss upon the guaranteed railways, the account of those railways was kept distinct, and was not amalgamated with the account of the Government Public Works?—I am not able to go back beyond the form of accounts which was submitted to Parliament last year, for instance, in May 1877; I have no recollection of the way in which it was shown in the Finance and Revenue Accounts previous to that.

Sir *George Campbell*—continued.

705. But at present the accounts are now devised in such a way that the guaranteed railways are for some purposes, lumped up with the other Government Public Works, are they not, so as to show the combined result of profit and loss?—No. If the Committee will refer to page 2 of the Finance and Revenue Accounts, submitted to Parliament in May 1877, it will be seen that the accounts of the guaranteed railways are separately shown, and not even included in the statement of the Ordinary Revenue and Expenditure.

706. But is it not the case that of late years a system has been devised by the Government of India, under which the loss upon public works is taken as a whole, including the guaranteed railways, the result of which is that the recent very large increase in the profits of the guaranteed railways counterbalances the loss which has been incurred upon more recent works directly made by the Government?—In the forecasts of 1873 and 1875, a statement was prepared, in which the guaranteed railways, the State railways, and the irrigation works were shown both separately and together, and in the revised account which I submitted to the Committee it is shown in the same way.

707. Then my question comes to this, when we consider the profit or loss of the railways which the Government has taken in hand, or may in future take in hand, would it not be somewhat misleading to set off against the losses which may be incurred, the very large increase which has lately occurred, partly in consequence of the famine and cognate causes upon the Grand Trunk system of railways, which was originally designed by Lord Dalhousie?—I think not. The present loss on the guaranteed railways is greater than the loss on the other two branches of the account; and on the other hand, as the capital expenditure on the guaranteed railways is now nearly ceased, their profits naturally grow at a greater rate than the other two departments of expenditure in which capital expenditure is still going on.

708. But still the fact that those main lines of railway, as originally designed, which may be called the first network of railways, are likely to pay, does not at all involve the sequence that other railways, in less populous and less paying parts of the country, are also likely to pay?—No; but at the same time the capital outlay per mile on those original railways was so much greater than what we are paying now, that the later railways will pay with a smaller traffic than those original railways have.

709. Do you think that many of the new railways are also likely to pay?—Certainly.

710. Do you think that the North Bengal Railway is likely to be a paying railway?—Yes.

711. Do you think that the narrow metre gauge, upon which it has been constructed, will suffice to carry the large amount of grain traffic which may be expected upon that railway?—I think so.

712. One more question, as regards the necessity for a sinking fund upon these great Government works; is it not the case that the seasons are very extreme in India, and that we are subject to great floods and calamities; is it not the case that there is a very considerable risk that the

great

Sir *George Campbell*—continued.

great railway bridges, such as those upon the Soane and the Jumna, which have cost very large sums, might be swept away by some calamity; is it not possible that the Soane and the Jumna may unite above the Soane bridge, and that that bridge may be either swept away or rendered useless; and again, is it not possible that some of the large anicuts may be swept away. And supposing that the capital account of those railways, or those irrigation works, is closed without a sinking fund to provide for such contingencies, do you see any way in which such a contingency as the loss of the Soan bridge, or the loss of a great anicut, could be met without either a sinking fund or an open capital account?—With regard to the Soane bridge, to take an instance, I have referred to the account of the guaranteed railways in the new form which I have submitted, and it will be seen that the traffic receipts of the East India Railway, in the year referred to, were 2,729,287 *l.*, and the working expenses were 1,140,021 *l.* Their net traffic earnings, therefore, were 1,589,266 *l.*; and if the Soane bridge were swept away it would involve an exenditure of perhaps something less than 1,000,000 *l.* sterling, spread over two or three years; which thus would be a comparatively small item in the net receipts of the East India Railway.

713. Your answer amounts to this, that even such a catastrophe as the loss of the Soane bridge might be met out of revenue?—Yes.

714. Would that be so with regard to other works which have not paid so largely?—I think if you take the Government of India works on the whole, both guaranteed and State, it would certainly be so; it is not likely that you would have calamities all over India at the same time, and I think the concern is sufficiently large to be its own insurance.

715. In these Papers regarding the forecasts of expenditure on railways and irrigation works, which were put in before the Committee met, I find a discrepancy which I do not understand in the amount of capital expended upon irrigation works; if you look at page 366 you will find that the capital account for the year 1871-72 is 10,659,000 *l.*, whereas if we look at page 402, we find that the capital outlay in all the provinces in 1871-72 is given as 4,397,000 *l.*?—I think that account at page 402 is the extraordinary outlay only. The account at page 366 was the total outlay.

716. The figures which you gave us the other day are the correct figures, I presume?—Yes, they are the best figures that we can get now.

717. Is it not a matter of fact that all the irrigation works which have paid very largely indeed, which have, say, paid upwards of 20 per cent. are old native works which have been taken over by us?—There are only three works which were originally constructed by the natives.

718. And those are the only works which do pay or are supposed to pay this enormous percentage upon the capital expenditure?—No, those three works are the Eastern and Western Jumna Canals, the Cauvery works; but the Godavery and Kistna works, wholly constructed by the British Government, are paying, on the whole, 17 and 14 per cent., as far as we can get the accounts at present, including the land revenue.

719. The general average which you have given us that all the Government irrigation

Sir *George Campbell*—continued.

works in India pay about 5 per cent. all round, includes those old native works which pay a very large per-centage indeed?—Yes.

Major Gen. *Dickens*, C.S.I.

21 March 1878.

720. And also includes the indirect revenue in the 5 per cent.?—Yes. The indirect revenue is the actual increase of land revenue due to the works, and it is called indirect revenue, because it is received in the accounts as land revenue, and not as Public Works revenue.

721. Is it not the case that that indirect revenue in the shape of increased land revenue or land-rent must be merely an estimate; is it possible to give the figures exactly?—I have explained already that it is based upon the reports, not of the Public Works officers, but of the officers belonging to the Revenue Department, called the settlement officers. Of course each officer may have a bias in his own judgment, but it is the best way in which we can get at anything of the kind.

722. By whomsoever the reports are made, is it not the fact that they must be mere estimates; is it possible, by any exact system of figures, to distinguish between the increase of revenue or rent which is due to irrigation, and that which is due to other causes?—I should not call them mere estimates; I should say that they were the best approximation that is possible to the correct amount.

723. Does the kind of account which you have given us showing the interest derived upon capital include in the capital account any interest charged for the time during construction, in which the capital was unproductive?—No. If the Committee will refer to No. 71, pages 152 to 155 of the Finance and Revenue Accounts of India, you will find that the old form of account of irrigation works showed the accumulation of interest; it was simple interest, and it was calculated from the very first on all the works. In the early time it was taken at 5 per cent., and in later times at 4½; and at page 155, in the last figure, the nett result of the whole thing appears. If credit be taken for the increase of land revenue, the nett result is a small sum in favour of the works, viz., 119,048 *l.*; that is, taking all the canals, good and bad, together, from first to last. If the revenue collected in the Public Works Department only be taken, there is a large loss, but we claim that the enhancement of the land revenue is a fair item of the revenue of the canals.

724. I think you said that those were the old accounts; under the new accounts, which have been re-cast, is this distinction to be made between the accounts as formulated, and the account which excludes the interest during construction?—I understand that the new accounts, for the sake of simplicity, have been prepared merely to show the profit and loss in the year's transactions.

725. Is not it a somewhat one-sided simplicity, as it shows only the profitable view of the case, and not the unprofitable?—I think not, because this account shows the unproductive capital from new projects as well as the account of the canals in work.

726. You mean that one item may be set against the other, and that inasmuch as the Government submits to a loss of profit upon works which are now under construction, you think it is justified in putting out of view the loss which previously occurred from the same cause?—I do not think it is necessarily put out of view, but the old account shows that it was not really of very great im-

Major Gen. *Dichens*, C.S.I.

21 March 1878.

Sir *George Campbell*—continued.

portance, inasmuch as it showed nearly a balance.

727. The new accounts do put it out of view, do they not?—Yes, they do leave it out.

728. I think you said that we may take the Ganges Canal as a sort of test of the results and profits of irrigation; that is a somewhat favourable test, I think I may say, inasmuch as you say that it returns a profit somewhat above that which you have given as the average profit. I think you said something about 6 per cent.; is it the case that, for a series of years, good and bad, the Ganges Canal has actually returned a profit of 6 per cent.?—I have not got the figures with me, but I think the return for the last three or four years has been about that. Sometimes it has been a little over 6 per cent., I think.

729. Including the indirect profit, and excluding the charge for interest during construction?—Yes.

730. With reference to capital, was there anything charged against the capital for cost of land and loss of land revenue when the canal was originally constructed, or for incidental expenses of that kind?—Yes, whenever anything was paid for the land; in some cases the land for the minor channels was given by the people free.

731. Was anything charged for capitalised loss of land revenue with reference to the land that was taken up?—No, only the actual payment for the land; but the capitalised loss of land revenue is always taken into account in considering the estimates for the works.

732. Can you tell us, with reference to the Ganges Canal, what interest it would pay if the charge for interest during construction be added to the capital?—The accumulation of interest is shown in the return to which I referred as a debt against the canal. Against the Ganges Canal of that year it stood as a debt of 1,168,885 *l.* I should say that is simple interest. This debt, I may mention, is diminishing from year to year. At present the revenue of the canal exceeds the interest, and a small sum every year goes to reduce this debt, so that in the course of perhaps 30 years or so it will be extinguished.

733. But is that a correct account. What I want to ask you is this, if this simple interest be added to the capital, then what interest would the canal yield?—It comes to the same thing in the end. The capital account without interest is 2,826,479 *l.*, and if this 1,168,885 *l.* be added to it, the return will be reduced to a little over 4 per cent.

734. In that case, would there be any surplus revenue to wipe off the debt for interest?—No; of course you can only take it in one way; you must either take the interest as we do with the guaranteed railways, as a debt account against the canal, independently, or you must take it from year to year as the capital standing against the construction. You cannot take it in both ways.

735. But that is just what I wanted to put to you; if you once admit that the interest during construction should be charged, then it results that there would be no surplus to set off against it?—The interest which I gave you was much more than the interest during construction; it was interest which had been accumulating from the first.

736. If you once admit that interest account there would be no surplus to pay it off?—If we take interest against capital for the first few years of construction, I think you will find that the canal would pay notwithstanding.

737. If you were to treat this company as a commercial company, as if a private company in the position of the Orissa Company had come in to make the Ganges Canal, that company would have no claim to the increase of rent from the land; it would make its profits only by selling the water, so that the question would then arise whether a commercial company, which had taken the Ganges Canal, would have both to exclude the indirect profits, and to add this accumulation of interest during the time that the capital was unproductive; is it not the case that an amount of that kind would reduce the profits from the present canal, viewed commercially, to a point far below an adequate interest upon the capital, such as commercial men expect?—I do not think it would be necessary to exclude the increase of land revenue; I think that might be provided for by a bargain between the Government and the company.

738. Was it ever proposed that the Orissa Canal Company should have the benefit of the increase of land revenue?—The company claimed that the Government should take no increase from the land. That was one of the difficulties which arose in dealing with the company.

739. But it never was claimed that the company should have the benefit of any increase of land revenue?—The company claimed that the land revenue should not be increased, and that the whole profits of the water should go to them in whatever way obtained.

740. May I put it in this way, that if the Government proposed to make over the Ganges Canal to a commercial company, do you think that anyone would be found to take shares?—I do not know, but I think the Government would not do anything of the kind.

741. Can you point to any modern canals within your own knowledge, with regard to which you could confidently say that if it was treated from a mere commercial point of view, it would pay?—I think that the profits would be too slow in most cases, that companies would not like to undertake such works, but they would be very glad to do them under guarantee.

742. Seeing how many of the best fields for irrigation have been taken up, are you yourself disposed to believe that there now remain fields for irrigation with respect to which a very large direct profit may be expected?—No; I expect that moderate and sufficient profits may be obtained by selecting the works carefully and constructing them economically; I do not expect anything very large.

743. I understood you to say, the other day, that not only the Plain of the Ganges, but also the Plain of the Indus, have been pretty well provided for; is it not the case that there is an enormous extent of that Indus Plain, in fact nine-tenths of the Punjaub, which is not yet provided with irrigation works, and in which the rain-fall is exceedingly small, and which is accessible to perennial rivers?—I divided the country between the parts which were sufficiently populous to enable great works to be undertaken with advantage, and the portion which I understood to be the western portion of the Punjaub generally, in which the population is scanty, and in

Sir *George Campbell*—continued.

in which therefore it is not desirable to undertake very expensive works at present.

744. Is not the soil in that part of the Punjaub very good; and is not the scantiness of the population principally due to the want of rain, and consequently to the want of means in raising a crop?—I think that population might be attracted to it in time; but I should not be disposed to undertake irrigation works on any expensive scale at present.

745. As regards the canals which have been made within your knowledge, may we not say broadly that you think it is to the indirect profits to which we must look to make them pay, and not to the direct profits obtained by the sale of water?—Referring to the Account, No. 1, of the revised accounts, it will be seen that the amount included as enhancement of land revenue, or indirect profits, is 723,830 *l.*, whereas the total collections are 1,228,993 *l.* The amount collected with the land revenue, therefore, is something more than one-half of the profits of the canals.

746. Then the result is to confirm the suggestion of my question, that for profit you look to the indirect profits, and that the direct profits would not in any case alone suffice to make the canals pay?—I cannot say so positively; for I think it is possible that larger water rates might be taken in some cases. I have no doubt that the water rate may be increased very much.

747. But in the majority of cases it is so, is it not?—There is another consideration with regard to the paying of irrigation works, and that is, that at present the water is used somewhat excessively, and the crops probably would be cultivated better if there was a smaller supply of water allowed. That is a defect in the management of irrigation works which has long been felt by engineers, and we have been endeavouring to devise some system by which water should be sold by volume, instead of the revenue being collected upon the area irrigated. It is possible, if that can be arranged, that equally good crops may be raised with perhaps not much more than half the present supply of water, and in that way there is a prospect of a considerably enhanced irrigation revenue hereafter.

748. You have taken credit for the indirect profit due to the enhancement of land revenue, and so on; is it not the case that there are some very considerable natural disadvantages which have not yet been fully estimated; for instance, is it not the case that a great part of the country which is now served by the Ganges Canal was formerly served by a very extensive system of well irrigation, and that those wells and all the capital sunk in those wells had been to a great extent destroyed and rendered useless?—I believe it is so, but the canal irrigation is preferable to the well irrigation, inasmuch as the water is supplied in a less uncertain way, and without the labour of raising it, which is very heavy labour.

749. Then is it not the case that several officers who have had great experience of those things, have suggested that, although in the first instance a free use of water has led to a very large increase of the crops, in the long run, after a series of years it has been found that the use of that water without a corresponding increase in the

Sir *George Campbell*—continued.

Major Gen. *Dickens*, C.S.I.

21 March 1878.

means of manuring the land, has led to the exhaustion of the soil, and subsequently to great deterioration; has your attention been called to a statement made by Mr. Halsey, the collector at Cawnpore, upon that subject, and also to a more recent statement which seems to have been made by Colonel Corbett, which appears to have been confirmed by the official adviser to the Government of the North Western Provinces in the agricultural department, and also to certain statements which have been made with regard to the Punjaub; are you prepared to give an opinion how far that suggestion is justifiable or not?—I have not had an opportunity of seeing those papers.

750. Are you prepared to give an opinion whether it is the fact the the excessive use of water without a corresponding increase in manure does exhaust the land?—I think it is very probable, but I cannot give an opinion in detail; I have never been employed on irrigation works in an executive capacity.

751. I think you are aware that the allegation has been made by many officers and by many of the people that those canals, in Northern India especially, have been attended with great unhealthiness and with a great increase of mortality among the population, and by a decrease of their physical vigour in many ways; will you tell us whether there has been any sufficiently exhaustive inquiry into the truth of those allegations?—Inquiries have been made several times, and the general result of the inquiries, I believe, has been that, so long as the drainage is carefully attended to, and the canal water-level is kept within the surface of the soil, that evil does not follow.

752. Will you tell me whether it has been found, as a matter of fact, upon the Ganges Canal and upon the Punjaub Canal, those evils up to the present time have existed?—Yes, I believe they have existed more or less up to the present time. The drainage of the canals is now being carefully attended to, and the Government is quite alive to the necessity of having it properly carried out.

753. Up to the present time those evils do exist?—Yes; more or less.

754. Then it is a matter of theory as yet, whether they can be remedied by drainage and by such means?—I think not. I think it is a matter of ascertained fact, that is to say, that the evils have not been found to occur where the drainage is good.

755. Will you tell me of any particular canals with regard to which you find that the evils have not occurred?—I can only state generally; I cannot give details at present.

756. As regards all the principal canals in Northern India, namely, the Baree Doab Canal, the Western Jumna Canal, and the Ganges Canal, is it not the case that up to this time there has been great unhealthiness attending them?—I think not universally; only in parts.

757. If this is your view, that it is quite certain that this evil can be cured by drainage, do you not throw an imputation upon the irrigation officers who have for so many years neglected to cure that which you think so curable?—It shows, perhaps, some want of foresight; but when the water is brought to a very dry country those evils do not show themselves for a long series of

Major Gen. *Dickens*, C.S.I.

21 March 1878.

Sir *George Campbell*—continued.

years, and it is hardly possible to anticipate them without actual experience.

758. You are of opinion, as I gather from your answer, that the faults may well be remedied by drainage, but is it not the case that there is a percolation from under the soil which it would be extremely difficult to remedy by drainage?—I think that could be remedied by drainage too.

759. Is it not the case that considerable tracts of country have been rendered barren by the permeation of salts from below upwards, showing that the natural course of percolation has been reversed, and that instead of water percolating downwards, it has begun to percolate upwards owing to the higher level at which those canals run?—The want of drainage is a defect, no doubt.

760. Do you think that this can be remedied by any system of subsoil drainage?—It has been remedied in some cases; I cannot give instances but my recollection is that in some cases in which land watered by the Ganges Canal was found to have become unhealthy from the accumulation of moisture, when the drainage has been carried out the defect has been found to disappear.

761. I will read you a passage which has come under my notice since the last meeting of this Committee. It is a speech by the Honourable Dr. Thornton, who represents the Punjaub in the Legislative Council of the Governor General, showing the prosperous position of the peasantry of the Punjaub, and the general prosperity of the agricultural classes; but he goes on to say: "Though the general condition of the Punjaub peasantry is such as I have described, I would guard myself against being supposed to assert that such condition is universal. Here and there it may be that owing to special causes, the state of the agriculturist is not so prosperous; for instance, on the banks of those great irrigation works, the Western Jumna and Baree Doab Canals. There are cultivators whose physique and energies have been destroyed, and whose lands have been defertilised by that fashionable panacea, high-level irrigation; in their case, and in the case of other exceptionally circumstanced tracts, some relaxation of the demand may be required;" do you think that there is a justification for the suggestion that the exception to the general prosperity is in the case of those unhappy people who live near the canal?—I do not understand it to be stated generally, bnt I understand it to be stated only of certain exceptional tracts.

762. Are you aware that a good many years ago a medical commission was appointed to go into this question upon the Western Jumna Canal, and that they tapped the spleens of the population for a considerable distance from the canal, and the result was a diagram showing that the size of the spleens of the population was in inverse ratio to their distance from a canal?—That was Dr. Dempster's Committee, which reported that drainage would remove the evils.

763. I think some 25 years have passed since his Committee reported, and those evils upon the Western Jumna Canal have not yet been removed by drainage, which only now is in progress?—In some cases they have been removed.

764. Speaking generally upon the Western Jumna Canal, the evil is now being dealt with?—Yes.

765. I asked you, just now, about the plains of the Indus; do you happen to know anything

Sir *George Campbell*—continued.

of the lower course, the delta of the Indus; why is it that there is no attempt to irrigate the delta of the Indus which might be naturally expected if we compare it with Egypt, to be the most fertile part of the country?—I am not aware.

Mr. *Agnew*.

766. With regard to the Sindh Railway, in the Paper delivered to the Committee this morning, the canals and irrigation works there represent an excess revenue of 132,000 *l*., but there are no working expenses charged?—There ought to have been a note to the canals, both in Bombay and Sindh, to say that in the returns received from the local governments the working expenses were deducted; we only got the nett figure.

767. Then this represents that the Sindh canals are realising a profit of 19¾ per cent., whilst the Bombay irrigation does not show any profit?—The Sindh irrigation is altogether of the kind that I have described as inundation canals. They are very simple works, and without them no cultivation is possible; and the consequence is that a large profit necessarily arises in those cases. I have already explained that I cannot actually vouch for the figures; they are the best that we can get; but I have not been able to verify them in detail.

Mr. *Hardcastle*.

768. I observe, in looking at the statement with regard to these irrigation works, that with the single exception of the Sindh and the two works in Madras, the Godavery and Kistna canals, all the large works appear to be unprofitable. May one take it as a general principle that the large profits of which we hear so much have been derived only upon very small works, and that the large expenditure, with those exceptions to which I have referred, appears to have resulted very unsatisfactorily in the matter of finance?—With the exception of the Orissa and Midnapore projects in Bengal, all the unprofitable large works will be found to be new works which are not yet in operation, or only lately come into operation, and therefore they do not show a profit at present, but we expect that ultimately they will show a profit something similar to the Ganges Canal.

769. With reference to Sindh, where the profits are so extremely large, can you say why irrigation should not be very considerably extended in that district?—The population is very small, and the cultivation is necessarily limited by the population.

770. I was reading recently a speech of Sir Arthur Cotton, in which he makes two statements of fact, upon which I should like to ask you a question. He says: "The Government have now taken the expenditure out of the hands of the companies, and are doing it themselves, and the result of the State railways is that we have spent 14,000,000 *l*. Last year's returns were 100,000 *l*., and the per-centage of profit was three-quarters; the carriage was 25,000 tons, or some trifle of that sort." Is that a fair representation of the present condition of the State railways?—No, because it leaves out of account the fact that a very small proportion of the railways have yet begun to work. The return in the accounts which I have submitted to the Committee will show that only one of the State railways, in fact, has been any time in operation,

Mr. *Hardcastle*—continued.

operation, and that shows a profit of 3·39 per cent. The others have either only just begun to work, or have not been working at all.

771. Is the amount of 14,000,000 *l.* an accurate statement?—No; 12,000,000 *l.* is the figure that I have got down here; but it may be 14,000,000 *l.* up to the date of which Sir Arthur Cotton speaks.

772. Then there is one other fact stated by Sir Arthur Cotton with regard to irrigation, and I will read you his words: "Let us see what the result of irrigation has been. A gentleman high in office, supported by the head of the railway department, came forward publicly and gave the figures to show that the actual return of all the Government works was 4¾ per cent. the lowest, and 40 per cent. the highest, and that the average of all was 7½ per cent.?"—I do not support that return. From the best figures which we have been able to get, we make the average return about 5⅓ per cent.

773. And with regard to the lowest return which Sir Arthur Cotton states to be 4¾ per cent., do you think that correct?—No; the Orissa works, for instance, do not even pay their working expenses.

774. An authority of considerable weight has been quoted, and I should like to ask you with reference to an opinion expressed by Sir Charles Trevelyan, who in speaking of what Sir Arthur Cotton had done upon the Godavery and the Kistna, said: "If all India were treated in the same way, famines would be impossible." Is it at all reasonable to suppose that all India or any considerable portion of India could be treated in the same way as those portions?—Certainly not; because in most parts of India there is no permanent supply of water available, and certainly not available at the small expenditure at which it is secured in those particular districts.

775. With regard to what fell from Sir George Campbell with reference to the direct and indirect profits so-called upon those canals, he asked you whether if those canals had been made by a company, that company not participating in the increased land revenue, the profits of the company would not be practically very small; but as a matter of fact, is it not practically the same thing whether the land revenue is increased, or whether the land revenue remains the same (as no doubt it would by agreement with the Government in the case of a company); and a water-rate is charged, would it not be very much the same thing, and would not the company derive very much the same profit in that way by water-rent, as the Government do now by the increase of land revenue?—The difference is this; that the water-rate is taken from the tenant, and it is part of his expenses of cultivation, whereas the increase of the land revenue is paid by the landlord, and comes in the enhancement of rent. The land revenue in India is the Government share of the rent.

776. Then that, I suppose, is one reason why it is so difficult to get those tenants to take the water, that they have to pay directly for it?—Yes, in many cases; it is natural, and I suppose it is the case with all peasantry, that they are very slow to change their habits, and if they have not been accustomed to take the water, they do not like paying for it. In Orissa, for instance, people are very willing to take the water when they get it for nothing, or can steal it, or when through an accidental breach in the canals, the water flows over their fields, but they do not like paying for it.

777. Then practically it would appear to be a better way of realising a return for the expenses upon the irrigation works in the shape of increased land rent, than by a charge for the water?—I think the land revenue is a matter which cannot be increased at will; it has to be increased upon a certain custom of the country. It depends upon rent, and if that was increased arbitrarily, the probable effect would be that the tenants could not be got to pay it.

778. With reference to the Ganges Canal, you stated that the stream in that canal was so strong that navigation was difficult; will you have the goodness to explain that?—The canals in India are very different from the navigable canals in this country. They are not still water canals; they are artificial rivers. The Ganges Canal receives about 5,000 or 6,000 cubic feet of water per second at its head. That water flows down the canal into its branches, and from the branches is distributed by small distributory drains all over the fields, so that an irrigation canal in India is a very different thing from a navigation canal of still water as you see it in this country. The defect in the Ganges Canal was due to the projector, Sir Proby Cautley, taking the slope of the bed at the same rate as had been found advantageous in the smaller canals, but when a large body of water came to be acted upon, it was found that the supposed proper fall in the bed, which I think was about a foot and a-half per mile, gave too strong a current, and that has had to be corrected since.

779. Is it generally the case that navigation canals, which are primarily intended for navigation, are defective in consequence of the rapidity of the stream?—No, it is not necessarily so. The stream can be made more moderate by giving the canals a less slope; for instance, a canal may have a slope of only nine inches per mile instead of a foot and a-half. Of course a larger channel is required than for more rapid canals.

780. Does the East India Railway run to any extent parallel to the Ganges Canal?—Yes.

781. It competes successfully with it, does it not, at all events for traffic?—Yes, the railway carries a larger traffic than the canal, but the railway has the advantage, of course, of the through traffic for long distances.

Mr. *Balfour*.

782. It is proposed, as I understand, to spend a large sum under the name of extraordinary expenditure which is expected to pay; of course the confidence that we have in such a policy entirely depends upon the confidence that we have that the Indian Government is likely to be successful in its forecasts; do you think that we have reason, from past experience, to repose such confidence in them?—Certainly, I think so, if they go on with the irrigation works and railways gradually and prudently.

783. As I understand that irrigation works and tank works have failed in cases where they have failed usually for one of two reasons, either there has been some mistake in the engineering estimates, or else, after the tanks has been made, it has been found that the people would not use them;

Major Gen. *Dichens*, C.S.I.

21 March 1878.

Mr. *Balfour*—continued.

them; those are the two main causes of failure?—Yes; I think that that applies rather to the irrigation works generally, not to the tanks especially. I think it may be said to be so.

784. In Bombay, the failure has rather been owing to the system of engineering forecasts, has it not?—I think it can hardly be said that there have been failures in Bombay. The works have not been long enough in operation for me to be able to say how far they will pay; for instance, the principal work which I referred to as the Moota Moolla scheme, has only lately commenced irrigating.

785. There are a considerable number of tanks in Bombay, are there not, from which you hardly expect much return?—Yes; those are small works.

786. That, I suppose, is owing chiefly to a mistake in the engineering forecasts or estimates?—I think that we are at present very imperfectly informed as to the returns from the works in Bombay; as I have already mentioned, we have been unable to get any satisfactory statement as to the revenue which is derived from them; but we do not expect those to be very remunerative which have been hitherto carried out.

787. Was any pressure put upon the Government of Bombay to make those works; in other words were they not left entirely to their own discretion?—The works had been proposed by the Bombay Government itself certainly.

788. Under any pressure?—No.

789. In Bengal and Madras there have been found great difficulties, have there not, in making the people take the water even when it was supposed that it would pay them to do so?—That chiefly applies to Lower Bengal, in the case of the Orissa and Midnapore Works. In Madras it applies to the case of the works of the Madras Irrigation Company, but not I think generally to any other works in the Madras Presidency.

790. And do you find that even the recent famines are not sufficient to teach the people the use of water?—I have not been in India since the last famine, so that I cannot say; but no doubt every famine, so far as my experience goes, does teach the people to use the water to a certain extent.

791. But they are apt to neglect the lesson when the immediate pressure of famine ceases?—Yes.

792. It appears to me that there must always be an element of uncertainty in any new irrigation works, from the impossibility of telling beforehand whether or not the people will take the water?—Yes; it is necessary to judge by the past history of irrigation in the same localities, and other circumstances regarding the climate and cultivation; but there is that uncertainty very often.

793. But for the prevention of famine, of course you would have irrigation works in new districts where irrigation works do not at present exist. What means have you of judging beforehand whether they will use the water?—Chiefly from the extent to which they resort to irrigation for their crops otherwise. For instance, in many parts of the country they irrigate from wells. Of course if they receive irrigation from canals at the level of their fields, it is so much cheaper in those cases that they are likely to take the water in due time. Also they make

Mr. *Balfour*—continued.

little tanks and cuts from the drainage channels in their districts, and make use of the water in that way. In those cases you may suppose that they would be glad to get the water permanently supplied by irrigation works.

794. Then you would not, as a practical engineer, recommend having irrigation works in any country where the people have shown no previous disposition to irrigate for themselves?—I would recommend that an experiment should be made upon a small scale first, so as to see how the people would receive the water.

795. You stated just now that not only was the area actually covered by canals in India, a very small proportion of the whole area of the country, but that only a small proportion of the country could ever be covered by the irrigation system, owing to its physical peculiarities?—Yes; I think that may be said in general terms, understanding it to apply to irrigation not liable to fail in time of drought.

796. I suppose, however, even in those parts where no irrigation is possible, famines have occurred, and are likely to occur again?—Yes; but I think it can hardly be said that no irrigation is possible in any part.

797. I mean no paying irrigation?—In many parts there is no irrigation that is possible dependent upon a permanent supply of water which would not fail when the annual rains failed. That is the difficulty. Of course a permanent supply might theoretically be got anywhere by spending money enough, but the practical question, of course, is the expense at which it could be given.

798. So that over a very large portion of the country, no system of irrigation can prevent a famine, simply because the system of irrigation would fail exactly when it was wanted?—Exactly.

799. Can you say of what proportion of the country this is true?—I think I can hardly answer that question, except in the general terms in which I stated before, that the central and southern part of India does not contain any permanent supply of water which can be relied upon for irrigation works, except in certain small parts which have exceptional advantages; for instance, where reservoirs can be formed which would contain more than one season's water supply, and where there are large rivers which can supply the irrigation works at their deltas, such as the Kistna and the Godavery.

800. So that, I suppose, you would say generally that over the high table lands in the Central Indian Peninsula as a whole, you could not protect the natives by irrigation works from famine?—I think not, on a large scale; I think that there is a large number of acres which might be protected by reservoirs, but compared with the whole extent of country that area would not be great.

801. You stated in your first day's evidence that irrigation occasionally damaged the land; in what way would it do that?—I mentioned some cases in reply to Sir George Campbell, and it was from the same cause as I mentioned, namely, the over saturation of the land and the water standing upon it.

802. With regard to the supposed deterioration of the land mentioned by Sir George Campbell, I suppose we have good means of forming a judg-

ment

Mr. *Balfour*—continued.

ment about it, owing to the fact that irrigation works have been in use by the natives for a very long time?—Not on a very large scale in Northern India. In Southern India they do not seem to find any evil follow from the saturation of the land with water, but in Northern India the only large irrigation work which was in operation for any long period under native rule was the Western Jumna Canal, and the irrigation was not to such an extent in those days as to bring about such a saturation of the land which has since taken place through the canals constructed by the British Government; the amount of water supply to the original canal was so very much less.

803. How do you account for the different effect which water appears to produce in Northern and in Southern India; is it owing to the difference of crops?—The difference of crops and of climate; so far as I know, the cultivation in the deltas of Southern India is chiefly rice.

Mr. *Agnew*.

804. With regard to an answer which you gave just now about the difficulty that has been found in getting the natives to take the water, was it not the case that in the Godavery irrigation there was an order issued making it compulsory on the cultivators to take the water?—I think, practically, in most parts of the Madras Presidency it is compulsory; that is to say, the people understand that if the means of irrigation are brought within their reach they will be assessed at higher rates, and it is to their advantage, because wet cultivation is more profitable to them than dry.

805. Has not that subject been mooted in other parts of India, to make it compulsory to take the water?—It has; it has been strongly recommended in many cases, but it has not yet been carried out.

806. With regard to the answer which you gave just now, about the saturation of the land causing unhealthiness to the districts; is it not the case that if water is applied to the deltas, that unhealthiness does not arise, but when water is applied in a new district, which has not been under irrigation, or where the water has not been well applied before, it is in those upper lands that the unhealthiness abounds?—Yes, that is our experience, certainly; the evil has not arisen in the deltas, as far as I know.

Mr. *Grant Duff*.

807. With regard to that point, before we pass from it, has it not been supposed that the water actually brought into the land certain salts, and so injured it?—I think it is rather a difficult question whether the salts existed in the land before or were brought by the water. In some cases, I believe, the salts existed below the level of the surface, and the waters brought them to the surface.

808. Has that been carefully examined into by chemists of repute, do you know?—Yes, and long reports upon it; and upon the salt effluvia from Northern India.

809. Recent reports?—I do not know whether there are any recent, but there have been a great many reports from time to time.

810. It has been frequently said that there are, in the Madras Presidency, a large number of small tanks which have been allowed to go to ruin; is that statement correct?—I cannot answer that from personal knowledge, but, as far as my official knowledge goes, I think the greater part of the tanks have been restored, and brought into use; but there are still some remaining to be restored.

Mr. *Grant Duff*—continued.

Major Gen. *Dickens*, C.S.I.

21 March 1878.

811. When did they go to ruin; was it in our time?—I cannot answer that exactly, but I believe it was chiefly in the disturbed times previously to our rule.

812. Then, so far as they have been repaired, do you think that that has been a wise expenditure of the public money?—Certainly.

813. I presume it has not been very costly?—No, naturally the repairs of works are much less expensive than the original construction.

814. And I presume that wherever the destruction has not gone too far, you would encourage those tanks being repaired and brought into use again?—Certainly.

815. Are there any irrigation works in the native States?—In some of them there are, specially I might mention Jeypore. The present Maharajah of Jeypore is very zealous in establishing irrigation works, and has constructed a great many moderate-sized works in his own territory, and with great advantage, I believe.

816. Could you mention any other native State in which there are irrigation works, either modern or ancient?—I think they are to be found more or less over the greater part of India; I could not mention any specially.

817. They are all very small, are they not?—Generally small; there are no very large irrigation works in native States that I know of.

818. I suppose, with regard to the ancient ones, it would be impossible for you to say whether they do or do not pay an adequate return for the capital expended?—Yes, because we do not know what the capital may be. They were constructed, no doubt, in a great many cases with free labour.

819. Do those which have been made by the Maharajah of Jeypore now pay an adequate return upon the capital?—I believe they do, but I have no detailed information upon the subject.

820. Do you think that detailed information upon the subject is in the possession of the Government of India?—I have no doubt that it might be obtained, but whether they actually have it or not I do not know.

821. Are you aware of the comparative cost of those works as contrasted with the works which have been made under the authority of the Government of India?—No.

822. But that could also be ascertained no doubt at the India Office?—Yes, it might be, but it might be difficult at the same time, because the customs of the native territory would be different with regard to the use of free labour, and so forth.

823. Do you happen to know whether the irrigation works in the native States are effective for the prevention of famine?—I should think probably not, because, generally speaking, they depend upon the seasons of rain.

824. Do you think, having regard to the financial considerations, that the Indian Government is doing as much for the improvement of irrigation as it can?—I think so; I would not recommend any sudden increase of operations.

825. You do not think that it would be wise

Major Gen. *Dickens*, C.S.I.

21 March 1878.

Mr. *Grant Duff*—continued.

to raise by loan a large sum of money, as has been proposed in this country, and to expend it in the formation of large irrigation works within the next few years?—No, I think not. I should be disposed to go on at a moderate rate, with a fixed expenditure from year to year.

826. In short, you would not do less than is now being done?—No, and I probably might do more, on careful consideration, gradually, but not in a hurry.

827. Nor, I suppose, would you guarantee the railway expenditure in order to expend the money saved upon canals?—No.

828. Nor *vice versâ*?—No.

829. In short, I suppose you would tell us that famine is best fought by the agency of the canals and railways jointly, and not separately?—I think so, according to the different peculiarities of the localities in which it occurs.

830. With reference to the Orissa Canal, did not the Government, when they declined to take over that undertaking, consider that if they drove a very hard bargain with the company, as regards their purchase by the Government, it would tend to discourage other capitalists in embarking their fortunes in India?—I do not think that that consideration was brought forward at all. I imagine that the Government of India at that time thought they had sufficient experience to say that it was not desirable that companies should be employed in irrigation.

831. It has often been said, and *primâ facie* it is quite correct, that the Government paid a great deal more than it was reasonable that it should have paid to the promoters of that scheme?—Yes.

832. But do you not think that the Government might fairly say in reply that if they had driven a very hard bargain with the promoters, their standing upon their extreme rights would have tended in all after time to make capitalists very unwilling to embark their fortunes in India?—I do not think that that consideration came forward at all in that case.

833. You do not think that the Government of India, in advising the purchase, was actuated by the idea that a generous purchase was the wiser course?—Except so far that they thought it very desirable to get the works into their own hands. Owing to the complications which had arisen with the company, they thought that if the works were taken under Government management it would be better for the people, and not disadvantageous, financially.

834. Do you think that they paid as much as they did because they could not get it cheaper?—Because they did not like to run the risk of its remaining longer in the hands of the company.

835. In short, you think that they made the very best bargain they could under the circumstances?—That I cannot say.

836. You think that that was their motive?—The management of the matter was necessarily left in the hands of the officials in this country. The Government of India merely stated the policy which it wished to adopt, and the extent to which it was prepared to go in paying for the works.

837. Did I understand you to say that the Rajpootana State line was paying only 3¾ per cent?—That was the last account, the amount which it paid in the year 1875–76; since then, I believe, it has paid more than 5 per cent.; but the official returns for the subsequent year have not come yet.

838. Has the extension to Sambur answered the expectations?—It has.

839. How far has the railway now been pushed on towards Peshawur?—Only to Jhelun at present.

840. From that it is to be continued on the broad gauge, is it not?—Yes; I am not sure whether the works have actually been carried out; in consequence of the expenditure on the famine the Government may have restricted this expenditure. In regard to the extension, the arrangements were ready to go on beyond Jhelun when I left India.

841. Is the part between Lahore and Jhelun now broad gauge, the whole of it?—I am not sure that the broad gauge line has been actually brought into work, but it was opened originally narrow gauge, and was to be changed to broad gauge.

842. What has been done about the Great Chenab Bridge?—An additional expenditure was incurred to fit it for broad gauge.

843. Was that expenditure very large?—No, I think it was moderate, although I do not remember the figure now.

844. With regard to the common roads of the country, are they going on satisfactorily?—I believe they are. The construction of the common roads is now left entirely to the local governments, and does not pass through the Public Works Department of the Government of India at all.

845. Do you know at all approximately how many miles of road are opened every year in British India?—No, I am afraid I cannot say that.

846. Do you think that we could find it out?—I think it might be got from the progress reports from the India Office, but it will take some little time to obtain it; I do not know of a return which contains it from year to year.

847. Common roads, I understand, are still charged against ordinary revenue, and are not paid for by loan at all?—They are charged to ordinary revenue under the head of Provincial Services.

Mr. *Mulholland*.

848. In those districts where you say the natives are unwilling to take the water, would it pay them to take it?—I think generally, it would.

849. You think it is merely prejudice?—Yes, prejudice and ignorance, and unwillingness to adopt new customs.

850. But if they could be induced to try it, they would find that it was profitable?—We find that this occurs on canals in the North-West; if a season of scarcity of rain takes place, water is very largely taken, and perhaps the next year a large proportion of cultivators take it; then, perhaps, the year after they have favourable rains, and they hold off, and so they go on from season to season; on the whole it grows slightly, but there are great fluctuations from one year to another.

851. I suppose the reason that canals are less profitable in Bengal and Bombay is, that the climate is such that they do not require so much water,

Mr. *Mulholland*—continued.

water, and there is more rain?—In Bengal that is the case, certainly, especially as regards the Orissa Works. In Bombay I cannot say exactly what the cause is; we have not got sufficient information about the Bombay Presidency yet. In Sindh, which is a part of the Bombay Presidency, water is very readily taken, because there is no cultivation without.

852. I suppose in fixing the difference between dry revenne and wet revenue, there is a considerable margin allowed for profit to the cultivator?—I believe so; I believe it is fixed upon the local customs of the country.

853. In your opinion, not only is there an extra revenue to the State, but an extra profit besides left to the cultivator?—It is understood there that it is so, and it ought to be so, no doubt.

854. With reference to the exhaustion of the land by irrigation, there cannot, can there, be any exhaustion caused by the water; the exhaustion is caused by the increased crop?—I think the water is supposed to carry away the salts and vegetable matter in the soil, when it is used too freely.

855. If it were judiciously used, so as only to take the place of rain, the only exhaustion would be the exhaustion caused by the greater crops?—Certainly.

856. And that of course could be replaced by a corresponding addition to the quantity of manure?—Quite so.

Mr. *John Cross.*

857. With regard to the ordinary revenue expenditure on extraordinary public works, I think you said, in reply to a question of the Chairman, that it would be the proper thing to create extraordinary public works out of the the ordinary revenue. I should like to ask you what proportion of ordinary revenue has in any year been expended on extraordinary public works?—I am afraid I cannot answer that question. When the category of the extraordinary was established, the understanding was that the money was to be borrowed or not according to the state of the finances of the country.

858. You could not say whether any works of a productive kind have been made out of the ordinary revenue?—I think a large proportion of them have; but the distinction has not been drawn; we have only taken the total sum as extraordinary, and whether it is borrowed or whether it is from the ordinary revenue is a matter of adjustment with the financial department, which would be very difficult to follow out.

859. You say that the reproductive works which have been finished in India have, to a considerable extent, been made out of ordinary revenue?—The greater part of them, I may certainly say.

860. With regard to the Orissa Canal, you spoke of the difference between the wet cultivation rate and the dry cultivation rate; could you give us any idea of the proportionate rate at which the land is assessed to wet and to dry cultivation?—That classification does not take place in Orissa, it is in the Madras works; but to the best of my recollection the difference is something of this sort, that the wet might be six or eight rupees an acre, and the dry would be two, or three, or four.

Mr. *John Cross*—continued.

Major Gen. *Dickens*, C.S.I.

21 March 1878.

861. Then the assessment in Orissa is not made upon the Madras plan?—No. Orissa is assessed on the same system as the North Western Provinces, on a 30 years' settlement.

862. Was any attempt made to show to the people by example the advantages of irrigation in Orissa?—I cannot answer that question exactly.

863. They would naturally be rather ignorant of the advantages of irrigation, would they not?—Yes, and I have no doubt that the Company's engineers and the Government engineers did all they could to explain it, but I do not know that there was any actual experiment carried out for the purpose; at least I do not remember it; it may have been so.

864. With regard to the difference between irrigation canals and navigation canals, would not irrigation canals cost very much less than those which are intended for navigation and irrigation combined?—That depends upon the supply of water. If the supply of water is large and the canal consequently large, the only additional expense is making locks to pass round the cascades or falls which we are obliged to interpose in order to prevent the water having too rapid a flow.

865. Does not that add enormously to the expense?—I think in the case of the estimate for the Lower Ganges Canal, we made out that the increase for expense was very small, not above 5 or 6 per cent., but that depends entirely upon the size of the canal. To make a small canal navigable would, of course, very greatly increase the expense.

866. To make a small irrigation canal would cost very much less, would it not, than to make a canal which would do for navigation as well as for irrigation?—Yes, but when you come to have a large flow of water, like the Ganges Canal for instance, which is a river 200 or 300 feet wide, there is very little required to make it navigable except making the locks to pass round the falls.

867. With regard to the Sindh irrigation, are any of those effects described by Sir George Campbell attributable to the irrigation in Sindh?—The country is so very dry that I do not think that that has taken place at all.

868. You stated that there was hardly any cultivation there without the canals, because there is no rain; would a great extension of irrigation canals produce a corresponding increase of revenue?—I think it would; but it must be remembered that the population of Sindh is very scanty, and it is necessary to limit the extension of canals by the population and the number of cultivators.

869. Is it not probable that the population would grow up to the full producing point?—Ultimately it might, and, if the extension were judiciously carried out, no doubt it would.

870. I think, in your evidence the other day, you spoke of the advantages of railways over canals in preventing famines?—Yes, in some cases.

871. Do you anticipate that any possible expenditure on irrigation works could cause so great a loss to the revenue as the late famines in India have caused?—I think it is quite possible; and a think it would be possible to cover India with irrigation works, costing much more than

Major Gen. *Dickens*, C.S.I.

21 March 1878.

Mr. *John Cross*—continued.

the expenditure that was incurred in the late famine.

872. Much more than the 14,000,000 *l.* or 15,000,000 *l.* which the famine cost?—Yes; at the same time I think that in many cases irrigation works would have saved the Government the expense; for instance, in the case of the famine of 1873-4. I think that irrigation works in Northern Behar might have been constructed for a less sum than was spent in averting that famine.

873. And you think that such irrigation works might in all probability avert famines in the future?—Yes, in that particular case.

874. And so avert the possible cost which may come upon the Government at some future time?—Yes, I think so, in that case.

875. Would that apply to any other districts in India?—Hardly, I think. I think there are very few other districts where there has been famine in which there is a supply of water so large and so easily made available as there is there.

Sir *George Campbell.*

876. Are you not aware that the question of the great irrigation works in Northern Behar was at that time considered by the Government of India, and that there was a very strong mass of opinion on the part of the planters and the zemindars and others connected with that part of the country against the scheme, and that, on further consideration, the Government of India determined not to carry it out?—I am aware of that, but I did not myself agree in that opinion.

Mr. *Onslow.*

877. The original desire of the Government of India in sanctioning the guaranteed system of railways was, I presume, to encourage private enterprise?—I cannot say whether that was so or not, or whether it was merely as the best mode financially of introducing railways; I rather think it was the latter.

878. You say the best mode financially of introducing railways. I presume by that you think that the Government at that time could not have raised money at 5 per cent.?—No; I think it was supposed that it would be better to introduce the agency of companies used to manage such works rather than undertake them directly by the Government.

879. I am talking of the interest which the Government at that time would have had to pay for borrowed money; the Company you see could get money under a guarantee from the Government at 5 per cent., and what I wish to ask is, whether you think that at the commencement of the East Indian Railway the Government of India could have raised the money, either in India or in England, at the same per-centage which they guaranteed to give for a specific work to the Company, namely, 5 per cent., because you are aware that at that time they were borrowing at a great deal less?—I think that the Government at that time was borrowing money at 5 per cent. or less. For instance, in 1854-55, the Government borrowed 6,000,000 *l.* at 4 per cent.

880. Then I understand from you that the Government could have borrowed money at less than 5 per cent., when they sanctioned the formation of the East Indian Railway?—I find by the Return that the loans from 1824-25 down to 1854-55, were all at 4 per cent.

Mr. *Onslow*—continued.

881. Was the scrip issued at par?—That I am not able to say; I believe it was.

882. Was this the state of the case, that at that particular time, when the East India Company began their operations, the Government were in a position to borrow at 4 per cent., and they guaranteed the Company 5 per cent.?—So far as I understand, with the view of getting efficient agency for carrying out the works.

883. Do you think that the Government at that time laid down rules severe enough for the transmission of the railway accounts to the Government of India year by year?—I think that there was a great deal that had to be learned by experience in the matter, and that the system was not efficiently worked at first from its being new to the Government officers concerned.

884. Are you aware what sum has been calculated as the net loss for which there have been no vouchers of any kind or sort whatever, particularly on this East India Railway?—Yes, I have heard it stated, but I think the difference was chiefly formal. I do not think that it arose from any misapplication of the funds, or any want of reality in the expenditure, but merely from the absence of certain formal documents at the time, and from the audit having been delayed in consequence, so that when the final account was made up, it was impossible to trace and to get the vouchers which would have been required according to rule; but with very little exception, I have no doubt that the expenditure was all *bonâ fide* and incurred properly.

885. Can you tell the Committee how much a mile the East India Railway has cost?—About 20,000 *l.* a mile.

886. Are you aware how much has been estimated as the cost per mile under Government supervision?—I think upon narrow gauge railways the estimates have generally been between 5,000 *l.* and 7,000 *l.* a mile, but they vary very much. For instance, the Northern Punjaub line, with the three bridges over the great rivers, of course has cost very much more.

887. I think I understood you to say that you think that the routes which have been fixed upon by the Government for their railways, what I may call the Government railways, are the best that could have been adopted?—I could not say that in detail, but I think that they are very reasonably good lines.

888. You told the Committee that you did not think that the line from Lahore to Peshawur would be a paying line, and that it was one of those political lines which have just been begun by the Government; but do not you think that when the line is opened to Peshawur there will be a great traffic through the Kyber Pass to Cabul?—I think there will be a very good traffic on the line, but considering that it would have to cross five large rivers, the capital outlay will be so large that I do not expect the interest will be paid.

889. Would it be engineeringly feasible, do you think, in future years, to construct a line from Peshawur to Cabul, through the Kyber Pass?—It would certainly be feasible, but I do not suppose it would pay.

890. When

Sir *George Campbell.*

890. When you say it is engineeringly feasible, do you speak with any reference to the ground, or merely upon the general principle that to engineers all things are feasible?—Something between the two. From what I have heard of the ground, I see no reason why it should not be done. I have no doubt that through most mountainous countries a railway can be carried.

891. Is not there reason to believe that a great part of the ground is one of the most difficult passes in the world?—It would be a very difficult ground, no doubt.

Mr. *Fawcett.*

892. Have you ever seen the ground?—I have not; I only know it by description.

Mr. *Onslow.*

893. Have there been many cases in which native states have applied to the Government of India to borrow money for making railways?—I do not remember any case at all in which native states have applied to borrow money for railways; bnt they have lent money to the Government of India with a view to railways being constructed for them, as, for instance, Holkar and Scindia. I believe that native governments have wished to borrow money for railways, but I do not know how far it was allowed, or on what terms it was carried out.

894. Has not the Nizam Government so applied to the Goverment of India?—Yes.

895. Do you know what the answer has been?—I believe it was allowed, but I am not sure under what circumstances. The matter did not come before the Public Works Department.

896. With regard to the system of light railways, which has been partially adopted in India, I would draw attention to one light line, called the Nalhatty Line; in a case of famine, do you think that a railway composed as the Nalhatty Line is, would be of sufficient use for transporting grain as a feeder from the main line?—Yes, we have had an instance of that in a line of about 50 miles, constructed in North Behar, during the famine of 1873-74. That was a metre gauge line, and it carried very large grain traffic, amounting, I think, sometimes to as much as 1,400 tons in a day.

897. And a light line of that description would be a good means, would it not, of conveying passengers to and from different places?—Yes.

898. In fact, for a country like India, I may judge that you would recommend the formation of those light lines from the main lines?—Yes.

899. I saw that Sir Andrew Clark said, in a speech, that he estimated that 30,000,000 *l.* had already been saved to India by the system of railways that we have at the present time. Have you any idea how that amount was calculated?—I have not.

900. Could you tell the Committee how much the Ganges Canal has cost altogether?—I think I have already stated that in my evidence.

901. I think you said that at the present time it yields 4 per cent.; in what year did it begin to yield anything at all?—I cannot remember now exactly when it began to yield any revenue, but it was 14 years before it yielded as much as 4 per cent., and now it yields about 6 per cent.

902. Of course that will depend very much upon the nature of the canal; but how soon do you think after the construction of a canal, and it is in proper working order, that the Government ought to expect a fair return upon the money which has been expended upon it?—In most of our calculations we have gone upon a supposition that they will not exceed the Ganges Canal in the rapidity with which they will give us returns, but we hope that they may do so in actual practice.

Mr. *Onslow*—continued.

903. That is to say, you have taken the Ganges Canal as your standard, and it was 14 years before it paid 4 per cent.?—Yes.

Mr. *Balfour.*

904. That must depend upon the anticipation which you have with regard to the use of the water by the natives, which must vary in different parts of the country?—Yes; it is a sort of average estimate.

Chairman.

905. Do you vary your estimate according to the habits of the natives as to the number that will take the water?—Yes.

906. You do not estimate your return upon the actual number of acres which can be irrigated by the works?—Yes, we do, the ultimate returns; but, in the growth of the returns to the ultimate amount, we estimate according to the probability of the people taking the water, and that depends upon the country and on the previous habits of the people.

907. And naturally, also, upon the rain-fall?—Yes, upon the country and the climate.

Mr. *Onslow.*

908. I think I understood you to say that, since the year 1867, all irrigation works have been constructed out of borrowed money?—Not out of borrowed money. The fact is this, that since 1867, all large irrigation works have been classed as extraordinary, and the head of extraordinary is such, that, if there are not sufficient means within the limits of the income of the State, money is borrowed to make it up.

909. What class of work has been, since 1867, constructed out of Public Works Ordinary?—There have been several sets of rules issued upon the subject, and the general scope of those rules was, that no work on which the capital outlay was under 10,000 *l.* should be included in that category, and that no work which is not likely to pay interest for the money should be included.

910. Would the repairs of tanks come under Public Works Extraordinary?—No, they would not be under Extraordinary; all repairs go under Ordinary. The Extraordinary head was used entirely for capital outlay of the larger works.

911. Are there any large irrigation works at the present time being constructed by the local governments from the Imperial funds?—They are all being constructed by the local governments; in fact, the whole of the irrigation construction has always been under the local governments, although from Imperial funds.

912. But I presume they have been supervised by the Supreme Government?—Yes, under the orders of the Government of India; but the local government has always had the direct control of the accounts as well as the construction of them.

Major Gen. *Dickens*, C.S.I.

21 March 1878.

Mr. *Onslow*—continued.

913. Then, as regards the provincial works which are constructed, I believe, from money raised by the different governors and lieutenant governors, are they supervised by the Supreme Government?—No, the Supreme Government merely requires returns, and of course in any case in which it thinks necessary to interfere, it does so, but as a rule it leaves it entirely to the local governments.

914. Has the Supreme Government advanced much money to the local governments for the construction of those works?—No; they have an allowance fund which is called an Allowance for Provincial Services, out of which they are expected to construct what they require; I am not speaking now of irrigation works, but of other works; but as to irrigation works there is an allotment of Imperial funds from year to year. When the Budget is settled an allotment is made to each of the local governments for irrigation, and for other matters of public works charge.

915. Has the Supreme Government ultimately any supervision of that money?—Yes, the accounts are sent to the Supreme Government, and the Supreme Government has its own officers to inspect the works.

916. You say that on account of those irrigation works, the land revenue has been increased, and that a portion of it has been credited to irrigation works; but might not the same thing be said of railways; does not a railway when it passes through a country increase the value of the land?—Not in the same sense. The water of irrigation works is applied directly to the land, and increases its productiveness. Railways, no doubt, increase wealth, and, in consequence, the value of the land follows; but it is not the direct object of the construction of a railway.

917. In those cases the natives do not pay directly for the water; in what part of India do the natives pay directly for the water which they use?—There are the payments made as water rates by the cultivators in the North-Western Provinces, in the Punjab, and in Bengal so far as irrigation has been carried out.

918. Is it to be the custom in future that the natives are to pay so much per acre for the water supplied?—The payment is as a rule taken from the cultivators directly in the first instance by the sale of water, and in addition to that the Government land revenue is increased by any increase in the rent of the land, so that the payment is taken in both ways.

919. Can you tell me what is the maximum per acre at the present time paid by the natives for water?—That depends upon the crop. For instance, the sugar cane is a valuable crop, and requires a great deal of water, and that is generally paid for at the rate of five rupees an acre in Northern India. It may have been increased lately, but that was the old rate. The wheat crop was paid for at about three rupees an acre.

920. What is the minimum paid?—I think it goes down to one rupee an acre.

921. That is for grain, I presume?—For some crops requiring less water.

Sir *George Campbell.*

922. Those are the water rates, merely?—Yes.

Mr. *Onslow.*

923. You told us that the Orissa Canal you thought would never pay, and I suppose it is for this reason, that you think that the natives there will never take the water which is supplied to them?—I think they will not take the water for a very long series of years, and practically the Government is not likely to get any interest for their money.

924. With regard to the Madras tanks generally, do you think it is possible in any other part of India to have a system of tanks the same as you have in Madras?—I think so.

925. Then you think that this system of irrigation works might be further extended?—I think they might be extended, and no doubt are being gradually extended, as in Rajpootana, where many tanks have been constructed, which I have already mentioned.

Mr. *Fawcett.*

926. The figures which you have put in, show that the net return on the State railways constructed up to the present time, is approximately one per cent?—Yes; but the year for which that return is made, was the one in which we had only just begun to work the railways.

927. I presume you have brought the latest figures available, and, therefore, there is no distinct evidence that the net return from State railways is larger than one per cent.?—No; but I know as a matter of private or semi-official information, that the Rajpootana line did pay over 5 per cent. the year before I left India; but the Rajpootana line is the only one which has been in work for any length of time, except the two old ones, the Calcutta and South-Eastern, and the Nalhatty.

928. In ascertaining the net returns, of course you have to make a certain deduction for working expenses; what proportion of what may be called the general establishment charges connected with public works are debited to State railways, or to guaranteed railways, or to irrigation works?—The railway department, as we call it, of the Government of India is entirely a separate branch of the department, and all the charges connected with it are debited in one form or other to State railways.

929. But independently of those, there are certain establishment charges which you cannot allocate to any particular department; for instance, connected with the public works policy, and carrying out the public works in India, there are a certain number of officials maintained at the India Office. General Strachey, for instance, received a salary for some years as consulting engineer in London; in what proportion are those expenses allotted to guaranteed railways, State railways, and irrigation works, or are they not included at all in the working expenses?—In the working expenses we do not include at all the public works secretariat to the Government of India; that is charged under the head of Civil; but we do not include such officials as the consulting engineer to State railways, the director of State railways, and all those who are to some extent executive, and not merely administrative officers.

930. Take simply as an example, an office like that of General Strachey's, which you may say is connected with the public works generally; that was put down as civil expenditure, and was not

Mr. *Fawcett*—continued.

not included in the working expenses?—I am not quite positive about that; it would be in the accounts of the India Office, but I am not familiar with them.

931. The expense of the secretariat has not been included in the working expenses?—No.

932. Is Cooper's Hill an establishment connected with the public works?—Yes.

933. Are you aware that there is an annual loss upon that establishment?—Yes.

934. And that is put down as civil expenditure, and not public works?—I think that comes under the head of Public Works, but I do not think it is charged to capital account.

935. Therefore that is not deducted in ascertaining what are the net results of the public works policy of India?—No.

936. Then, considering all those circumstances, you are in a position to show what distinctly represents the expenditure associated with public works, but which are not included in the working expenses of the public works?—Yes, quite so; but I suppose the amount, if it was worked out, would be found so small that it would not appreciably affect the result.

937. Supposing I were to say that it is a very large amount, quite large enough very considerably to affect, for instance, the returns which you have given, can you bring forward any figures to disprove my assertion?—I think, for instance, that the expenditure on the Public Works Secretariat in India was about 20,000 *l.* a year, and if that is compared with the working expenses in the various current expenses shown in these accounts, it will be found to be a very small proportion.

938. Does it include Bombay and Madras?—Bombay and Madras are charged; it is only the secretariats of the local governments, the main part of it is charged to the chief engineer offices.

939. How much again would you allow for pensions?—That is another item which might be added.

940. For instance, I understand that at the present time there are about 1,100 engineers employed in the public works department; would that be correct?—Yes.

941. And every one of those after a certain number of years' service would be entitled, would he not, to a pension?—Yes.

942. I suppose it would not be an extravagant estimate to say that the average amount of those pensions is about 400 *l.* or 500 *l.* a year?—Possibly, hardly that; say 400 *l.*

943. There are 1,100 engineers, Europeans, at the present time, holding an office which will after a certain period entitle them to a pension of 400 *l.* a year; that is not included in the working expenses, is it?—No; I think we made a valuation for that class of expenditure on one occasion, which, however, was not finally accepted. It was under discussion in the Financial Department when I left; but the valuation came to this, that a charge of about 5 per cent. on the establishments would cover all such charges, and the establishments being 25 per cent., roughly, in the case of irrigation works, and about 15 per cent. in the case of railways and canal works, 5 per cent. on that would be about 1¼ per cent. in the one case, and about 0·7 per cent. in the other on the capital account.

Mr. *Fawcett*—continued.

944. But then, as you have not the figures here, would not it be possible, for instance, to go through the Pension List, and, by making an approximation, to find out the exact number of people who at the present time are in the receipt of pensions in consequence of service connected with the Public Works, and give the exact amount, so that the calculation should be precise and not an estimate?—Yes, but the calculation in that case would be rather too favourable to the Public Works Department, because the Public Works Department has been of gradual growth, and as yet the Pension List is very small, so that we prefer to take it by valuation on an actuary's view of the probable pensions, and that method was accepted by the Financial Department.

945. You said that there were 1,100 engineers at the present time being employed in India; are there any figures to show what is the aggregate amount of the salaries of those engineers?—Yes.

946. What is it?—The average all round, I think, is about 600 *l.* a year.

947. So that what is proposed is an annual expenditure of 3,000,000 *l.* on State railways, with an expenditure of a million and a half on irrigation works; and, to superintend an annual expenditure of four and a half millions, you would add to that the engineers' salaries, 700,000 *l.*?—Yes, about that; engineers and all their subordinates.

948. I understand you to say that that was the average pay; but that does not include the whole expense of the engineering establishment?—No, we divide the engineering establishment into engineers, subordinates, and lower subordinates, who are very small fry amongst the native establishments.

949. But those 1,100 engineers, as I understand you, receive on the average 600 *l.* a year?—Yes.

950. Therefore, the expenditure alone on engineers would be about 70,000 *l.*; what is the expenditure on those whom you have described as their subordinates, and the subordinates to them?—We reckon them generally to come pretty evenly to 25 per cent., and on irrigation works about 15 per cent., of the expenditure for the railway establishments.

951. I want to bring out the engineering charges. I understand that there are 1,100 engineers, every one of whom employed is getting 600 *l.* a year each on the average; then, besides that there was mention made in a previous answer of two other classes, who you said were the subordinates of those engineers and their subordinates; what is spent upon them?—I cannot say off-hand what the amount spent upon them is.

Sir *George Campbell.*

952. This 700,000 *l.* which is expended upon engineers and their establishments, is for an expenditure of four and a-half millions extraordinary, but as a rule the engineers expend a very large sum which comes from other sources?—Yes.

953. So that the expenditure upon establishments is a great deal more than 700,000 *l.*?—Yes, of course.

Major Gen. *Dickens*, C.S.I.

21 March 1878.

Major Gen. *Dickens*, C.S.I.

21 March 1878.

Mr. *Fawcett*.

954. In estimating the returns from the guaranteed railways, as I understand you, you ascertained those returns from taking the last two or three years which have been very favourably affected by the famines?—Yes, partly by the famines.

955. But with regard to the irrigation works, you have had returns over a much longer period to enable you to arrive at the result there?—No, these results are all for one year, the year 1875-76 for irrigation works, with the exception of two or three which were not included in the Return submitted to Parliament which we take from the Administration Reports of the Madras Government at certain dates mentioned, 1872-73 and 1874-75.

956. With regard to the irrigation works, would the Committee be correct in drawing these general conclusions from your evidence, that the most successful works are those which were designed by natives, that a few works which have been entirely designed by Europeans have been successful, but looking to the direct financial results, a great number designed by Europeans have been complete failures?—I do not think that could be stated.

957. I mean complete failures, looking at them financially, and at their direct results?—With regard to the works designed by natives, we have the Eastern Jumna Canal, which was designed and carried out, and appears to have been in operation only for one year; that, you may say, was a failure under native engineers, and it was made a success under European engineers of later days. I think the difference applies not so much in their being constructed by Europeans or by natives, but to their being constructed in the old days when work was so much cheaper than it is now.

958. But still, in the case of most of those works, before they were undertaken very confident predictions were made about their success, but there seems to be so much uncertainty arising from the various circumstances which you have alluded to, that after the experience of the past, it would be, to say the least, rash to feel very confident that any particular work would pay?—I think we must expect to have a certain number of failures. We have had one very great one in the Orissa and Midnapore projects; but taking them altogether, we still find that we are getting $5\frac{1}{3}$ per cent. from the whole money expended; and where we find the income from the old works is so satisfactory as that, I do not think there is any reason to fear that our later projects will in the end be unsuccessful.

959. Some very successful works were designed by natives, were they not?—We have only got in this list of the larger or extraordinary works, three works which were designed by natives; that is to say, the Eastern Jumna Canal, which I have already mentioned, and the Western Jumna Canal, which went out of use, and ceased to receive any water about a century ago, and was re-opened by the British Government, and there are the Cauvery works in Southern India. Those were native, and they were added to by the British Government under Sir Arthur Cotton's advice. Those works have been very productive, partly because the circumstances were very favourable, and partly because, no doubt, there was some expenditure which was

Mr. *Fawcett*—continued.

incurred under the Native Government, which we got the advantage of, especially in the earlier times of the canals.

960. Frequent reference is made in the reports on the Moral and Material Progress of India, to the native works, and their extraordinary duration; I think it was said that on many occasions anicuts have been constructed, whose age is almost fabulous; in other instances they have been described as having been in existence 1,000 years, and therefore that shows that the natives have had the capacity to design very great works?—They have, no doubt.

961. How many natives are employed as chief engineers in India at the present time?—I could get the returns and answer your question from them, but I cannot answer it off-hand.

962. There are very few, are they not?—I do not think you could say they are very few.

963. If I understand the present plan, it is this, a certain number of engineers are sent out every year from Cooper's Hill?—Yes.

964. It is possible, of course, for a native to be educated at Cooper's Hill; but if he is educated there he is weighted with the great disadvantage of having come first of all to England, and passed a competitive examination in order to obtain admittance?—Yes.

965. And the number of students who are annually sent out from Cooper's Hill is sufficient, and from what you allege is more than sufficient, to supply the engineering wants of the Public Works Department?—At the same time the Government undertakes to receive a certain number of students from the colleges in India, who are generally natives, and from them we receive a considerable supply of young educated men as engineers.

966. But the Government is pledged, is it not, to give employment to those young English engineers, or young students, who come from Cooper's Hill?—Yes.

967. And more, I believe it has been again and again stated that the supply is quite sufficient for the engineering wants of the Public Works Department, and that the demand for native engineers in India must gradually become less and less, till it is reduced to a minimum?—I think not. I think that a certain number of engineerships are guaranteed to those who are educated in the colleges in India, and also to natives.

968. There is an engineering college, called Roorkee, since Cooper's Hill got fairly in work, and young English engineers have been sent out from this country; how many of the native students, who were educated at Roorkee, have received employment as engineers and have been placed in the same position as students from Cooper's Hill?—I could ascertain that by referring to the returns.

969. The number is very small, is it not?—The number is not very large.

970. Not five a year, is it, and some years not two?—Not from Roorkee.

971. And some years but one?—It may be so if only one native student qualifies.

972. What other college is there?—There is the Presidency College at Calcutta.

973. How many from that college?—I think there are generally three or four a year.

974. We have had one taken from Roorkee, and

Mr. *Fawcett*—continued.

and three or four from the Presidency College at Calcutta; and that is the chance that the natives have of obtaining first-class engineering employment, unless they incur the expense of coming to England to compete for admission at Cooper's Hill?—Yes; but the great difficulty we find with the natives is not that they fail in the first instance; they are generally quite equal to Europeans in going through their studies, and so forth; but when we get them actually at work, they fail in energy and strength of character.

975. Considering the great and successful works which have been constructed by the natives in later years, I want to know under what influence the character of the native has deteriorated?—I think you will find occasionally some very useful men amongst them, but I must say they are very rare.

976. No doubt, but even in those cases of rare ability, if they exist, as you say they do, they have very little chance out of a vast population like India of coming to the front if there are so very few appointments?—That is true.

977. Is not this a fact, that students have been educated at the Engineering College at Roorkee, and have passed very successfully, and then they have waited a long time for employment, when students from Cooper's Hill have been put in before them?—I think that may have been the case if they were not wanted, and the number of appointments guaranteed for the establishment was full at the time.

978. Therefore, this plan of guaranteeing employment to a certain number of those who pass Cooper's Hill successfully, distinctly diminishes the chance of the natives of obtaining employment, unless they are prepared to come to England and enter the college?—Yes; at the same time I do not think we should get, as the natives now are, a sufficiently qualified establishment of natives to carry on the works.

979. Still, if the thing was not so difficult, if it was all left to the open market, if it was found that there was a supply of competent engineers from the natives of India, there would then be a better chance of their obtaining employment than there is now, when as, I believe, employment is guaranteed to a certain number each year from Cooper's Hill?—Possibly; but at the same time, as I have said already, the difficulty in employing natives is not in getting them to pass the preliminary examination, but in getting men of sufficient strength of character and energy to be useful in carrying on works afterwards.

980. Are you aware that Cooper's Hill entails a loss?—Yes.

981. And, therefore, as far as the financial results of what may be called an offshoot of the public works policy of the Government of India, as it acts upon the people of India, one effect of it substantially is to diminish the chance which the natives of India have of obtaining employment?—That may be said, certainly.

Sir *George Campbell.*

982. Is it not the case, when you say that there is a very small number of native engineers educated at Calcutta and Roorkee who are employed on the same footing as the engineers imported from Europe, you merely mean that that small number are, in the first instance, appointed on the same terms as regards salary, remuneration, and rank, as European engineers; but, on the other hand, it is not the case that employment upon a lower scale of salary is very freely offered to those native engineers?—It is so.

983. Is it not the case that up to this time, what with the direct Government employment, and what with the demand that there is for engineers of an inferior class, for municipal, local, and other works, our difficulty has rather been to get a sufficient number of qualified native engineers, and to find employment for those who are duly qualified?—I think I have generally found complaints that there are too many natives, and that a larger number of Europeans would be advantageous to the department.

984. What I want to know is this: is it not the case that the supply of native engineers produced by those colleges is readily taken up in one department or other of the public service?—I think it is. I think there are always employments open to them, but they are sometimes unwilling to accept the inferior grades.

985. Is it not the case that natives who accept employment on inferior terms to those which are given to Europeans, have an opportunity, according to the rules of the department, of working their way up to the highest grades if they prove themselves fitted for them?—Yes.

986. Is it not the case that in the engineers' department there is no such feeling as exists in the civil department, in the distinction between covenanted and uncovenanted, but on the contrary, in the engineers' department, every man, be he native, or be he European, has a full opportunity of rising to the highest grades, if he proves in practical work his merits and his capacity for higher employment?—Yes, provided there is room in the department for him; it is not done when the department is full in the higher grades.

Mr. *Fawcett.*

987. If a man is admitted in a subordinate position, he surely has not the same chance of rising as if when he started, he was admitted to a better position?—Quite so.

988. Therefore, what you have just been stating does not at all affect the chance of the native ultimately rising?—Of rising to the higher grades, certainly.

Sir *George Campbell.*

989. But there are departments in the public service in which it is found necessary to pay the higher price for the imported and expensive European article, than for the indigenous article which costs you but little?—Yes, our policy is to give the native officer a chance to go on along with Europeans, but practically we find that with very few exceptions he is not fit to be ad-advanced beyond the lower grades.

Mr. *Fawcett.*

990. That does not meet my point; because what I was examining you on was this: you may act upon the principle of saying that where

Major Gen. *Dickens*, C.S.I.

21 March 1878.

Mr. *Fawcett*—continued.

natives and Europeans do the same kind of work, the natives should be paid less; but what I am asking, and I think you have given me very clear information upon the point, is this: whether it is not a fact that independently even of pay, important and influential positions in the Public Works Department are, in the great majority of cases, allotted to students who come from Cooper's Hill, and not to students who are educated in the native colleges?—Yes, that is a fact as regards the supply of engineers from England; Cooper's Hill has only lately come into operation; but I do not think that it depends upon the position in which they enter, but upon their conduct after entering the department, as to their being fit to take the higher positions.

Mr. *Fawcett*—continued.

Sir *George Campbell.*

991. As regards the great native works by native engineers, with the exception of one case, the Cauvery Works, do you know a case in which any very great engineering works have been executed by native engineers?—I think the old works of what was called the Delhi Canal in former days may be classed as such.

992. Is there any existing great native work upon any canal now?—There is very little left, I believe.

Thursday, 28th March 1878.

MEMBERS PRESENT:

Mr. Agnew.
Mr. Ashbury.
Mr. Balfour.
Sir George Campbell.
Mr. Childers.
Mr. John Cross.
Mr. Fawcett.
Mr. Hardcastle.
Mr. Sampson Lloyd.
Mr. Mulholland.
Mr. Onslow.

THE RIGHT HONOURABLE HUGH C. E. CHILDERS, IN THE CHAIR.

Major General C. H. DICKENS, C.S.I., called in; and further Examined.

Chairman.

993. I THINK you wish to add something in explanation of one of your answers on the last day that the Committee met?—I should like to be allowed to say, with regard to my evidence on the last day, in answer to a question put to me by the honourable Member for Hackney, in which he said, that practically the highest engineering posts were open to the Cooper's Hill students; I should have mentioned that the Cooper's Hill students are quite a late importation of engineers, and they have had no opportunity yet of rising to the top of the department.

Mr. *Fawcett.*

994. How many native engineering colleges are there?—I think there are: first, Roorkee, in the North-Western Provinces; next, there is the engineering branch in the Calcutta Presidency College; there is a college at Poonah, and another at Madras, I believe, connected with the Madras University.

995. The number of students at those at the present time is very small, is it not?—I am afraid I cannot answer that question without referring to the papers. On referring to the papers I find that 21 students were admitted into the engineering class at Roorkee in 1871, of whom 15 were Europeans and 6 natives. Fourteen passed out of the college in that year, of whom 13 (12 Europeans and 1 native) received certificates of qualification. Eight engineer appointments are guaranteed to the college. Later reports on Roorkee were not available at the India Office. There were 154 students on the rolls of the Calcutta Presidency College in the engineering branch, of whom 44 obtained certificates of qualification that year; only 4 of these obtained the degree of Bachelor of Civil Engineering. In the Madras Civil Engineering College, 208 students were on the rolls, 4 passed for assistant-engineers in the same year. In Bombay, there were 163 students; 9 passed for the degree of L.C.E., of whom 3 were placed in the first class. The number of students given includes those who only aim at lower qualifications; not above 10 per cent. aim at qualifying to be assistant-engineers. The number of appointments guaranteed to the other colleges is very small, much less than to Roorkee; I cannot trace the exact number.

Mr. *Fawcett*—continued.

996. But a certain number of students are admitted every year to Cooper's Hill, are they not?—Yes.

997. And if they pass a certain examination, they have a right, have they not, to a certain position in India?—Yes; I believe that is the case now.

998. And the consequence is, that if there are only a certain number of those positions vacant, those Cooper's Hill students, having a right to those positions, diminishes the chance of the natives obtaining them, unless a native becomes a Cooper's Hill student?—Yes, it does so theoretically; but, practically, I hardly think it produces that effect, because the natives do not generally rise in large bodies to the upper ranks of the department, not because they have not an opportunity of admission, but because they have not the qualifications to enable them to rise.

999. Is it not the fact that the students have been admitted to Roorkee and have passed the examinations, and have been much longer in obtaining what you may call the first grade of employment in the Public Works Engineering Department, and where a Cooper's Hill student is admitted, who has passed a similar examination?—At Roorkee they guarantee only a certain number of appointments. Some students pass very creditably who do not come within the number of guaranteed appointments, and then they have to wait for openings in the service.

1000. But of course the number of appointments that are guaranteed at a native college like Roorkee must depend upon the number of appointments that are likely to be vacant?—I think the number of appointments guaranteed from Roorkee was fixed before the Cooper's Hill College was established, and they have not been altered since.

1001. Are you certain of that?—I am not positive; but that is my impression.

1002. You expressed an opinion that no very important native irrigation works are carried out except the Cauvery anicut?—The Cauvery and Western

Major Gen. *Dickens*, C.S.I.

28 March 1878.

Mr. *Fawcett*—continued.

Western Jumna canals were the two that I mentioned.

1003. I will place in your hand the Report on the Moral and Material Progress of India during the year 1871-72; will you turn to page 60, and read the passage which I have marked there referring to the native irrigation works of Madras?—"The Nizam's territory, Mysore, and the Carnatic, are covered with thousands of tanks. In the 14 districts of Madras, there are said to be 43,000, all of native origin, with probably 30,000 miles of embankments, and 300,000 separate masonry works. The revenue dependent on tanks was 1,500,000 *l.*; yet in 1853, not one new one had been made in Madras by the English, though many had been allowed to fall into disrepair."

Chairman.

1004. Who is that report signed by?—There is no signature to it.

Mr. *Fawcett.*

1005. That is a recognised official document, is it not?—Yes, it is stated to be presented pursuant to Act of Parliament, and ordered by the House of Commons to be printed.

1006. Of course the Government of India is responsible for the statements?—Yes.

1007. If in one district of India, not a large district, the revenue from native irrigation works was at one time a million and a half; that shows that it is considerably larger than the revenue which we obtain from the other irrigation works which we have constructed?—No; at present the revenue dependent in some way on tanks is about 2,000,000 *l.*; but this "revenue dependent on tanks" does not mean that it is a revenue which would entirely cease if the tanks were destroyed, but it is the whole of what they call the wet revenue, of which, probably, one-half would be lost if the tanks were destroyed, and the land would then be cultivated with dry revenue.

1008. But there is nothing to show in that statement that in saying that the revenue is 1,500,000 *l.*, that that revenue is not estimated in exactly the same way in which the Government now estimates the irrigation revenue?—Quite so; but the "revenue dependent on tanks" is a technical phrase, and we understand by that always the wet revenue.

1009. But that passage, assuming it to be correct, as we are bound to do, shows that formerly very important irrigation works were constructed by natives in those 14 districts of Madras?—There is a great multitude of what we should call small works. When I spoke of large irrigation works, I referred to those great works which we have included in our classification as Extraordinary.

1010. But still those figures show that if those very extensive works, whether large or small, were constructed by natives in the 14 districts, which is not a very large area, and through native agency, those districts must be well irrigated?—Yes; in the sense of being irrigated by small works, most of which would fail on the failure of the local rains.

1011. Going to another part of India, in the same Report, will you now turn to page 38, where, I think, you will see that the district between the Chenab and the Sutlej was made one of great fertility through native irrigation works?—"During the period of native rule, well irrigation, and that from inundation canals

Mr. *Fawcett*—continued.

were alone available. By these canals the district of Mooltan, between the Sutlej and the Chenab, where rain hardly ever falls, is converted into a succession of beautiful gardens, shaded by date palms. There is a burning sun above and canals flowing below. During the winter the water of the rivers is not sufficiently high to enter the canals, some of which are artificially excavated, while others are merely channels abandoned by the rivers; but, as the rivers rise in the spring, from the melting of Himalayan snows, the water gradually enters the channels, which obtain their maximum volume in summer; so that, when water is most needed, when the sky is brass and the earth iron, the inundation canals from April to October produce luxuriant crops. The corn, before yielding its grain, is twice mown down as fodder for cattle, and then ears, and produces abundant harvests. The mangoes are only second to those of Mazagon, and oranges and pomegranates grow in profusion."

1012. That was done through native agency; it distinctly says that it is not simply by wells and tanks, but by canals diverting the course of large rivers?—Those are the inundation canals of which I spoke in my evidence, and which are very simple works. They are mere trenches cut out from the margin of the river into the country. They irrigate a very large extent of country, no doubt, but they are very simple, and, probably, works having no masonry at all in them in many cases.

1013. But, if a simple work is successful, its simplicity is its strongest recommendation, is it not?—Certainly.

1014. It is not a recommendation to a work to have it complex if the simpler work is attended with success, and according to that statement the success is complete, is it not?—Yes; it is a kind of irrigation which has been practised for a very long period in that part of the country.

1015. Therefore this irrigation, simple though it be, was designed by natives?—Yes, entirely so, no doubt.

1016. I want to show how much the natives have done, because the simpler the works are, it seems to me, the better; and I am asking these questions to bring out this fact, that the native irrigation works were simple and inexpensive and successful, whereas many English works have been complicated, have been carried out on a large scale, and have been, as some of our figures have shown, unsuccessful. I will ask you now to be good enough to turn to page 39, where there is another district which is referred to as irrigated by native works?—"In the Derajat, on the right bank of the Indus, the canals run parallel with the river, and fill during the periods of inundations. There were 12 of these canals, with an aggregate length of 291 miles. The landowners arranged the distribution of water among themselves for the Khurref crops, which are all grown on canal lands. The native state of Bhawalpoor, on the south side of the Sutlej, is also dependent on inundation canals, its Khadar lands bordering the river being 10 to 12 miles wide. In a former age such inundation canals were conducted from all the five rivers of the Punjab, and traces of them are perceptible with ruins of cities and villages on their banks."

1017. That passage shows that canals from the whole of those five great rivers were used by the

Mr. *Fawcett*—continued.

Major Gen. *Dickens*, C.S.I.

28 March 1878.

the natives to irrigate the country, that those irrigation works were successful, and that the land was made so fertile that there were great cities which under our rule fell into ruin?—I do not know of what date these cities were; it would require a great deal of investigation to be able to give a decided opinion upon that; but there have been great changes in the course of the rivers which seem to have altered the face of the country very much since that time.

1018. But still that passage shows clearly that the natives having those five great rivers, used them successfully for purposes of irrigation?—Yes, certainly.

1019. I will now refer you to page 55, which will give one instance of what we have done compared with the natives, with regard to constructing irrigation works in the district with a rainfall average of 60 inches, and where consequently the natives so little want the water, that they consider the irrigation schemes there a very great hardship; I refer to Midnapore, and I will ask you to read the description which is given of Midnapore on that page?—"The scheme comprises the irrigation and drainage of 200,000 acres, as well as a navigable canal from Calcutta to Midnapore. The estimated cost is 700,000 *l.* About 101 miles of distributaries have been made, commanding 60,000 acres, and are in use; but smaller branches to villages are much needed. They could not be made by the people, or at least the people would not make them, so it was determined as an experimental measure that Government should do so for the first 50,000 acres in the upper reach of the canal. The people did not care for the channels, grudged the land, and viewed their construction as a grievance. Irrigation is not popular in Midnapore, a proof that the rainfall is abundant."

1020. That shows that the irrigation works in that district which have been constructed by us, are unpopular, because there is abundant rainfall, and the natives do not want the water?—I think not altogether that.

1021. It is partly that?—Yes, it is partly that; but the people are very willing to steal the water when they can get it for nothing.

1022. Still water is not so essential, and they look upon it as a hardship, having a large rainfall, to pay for it; that is the deduction to be drawn from that?—I believe they would consider it so, if they were made to pay for it; I do not think that the last sentence is altogether correct.

1023. Then you doubt the correctness of this official statement?—Yes.

1024. But that official statement has been published for many years, and has been laid before Parliament, and there never has been any doubt thrown upon its accuracy?—I do not know by whom it was prepared; it was never submitted to the Public Works Department of India for revision.

1025. You are reading from a book which by Act of Parliament is laid before the English Parliament to give Parliament the best and most accurate information on the moral and material progress of India, is it not?—I believe it is.

1026. With regard to the Orissa works, you said that the Government bought those works at what they considered they were worth; how do you explain that statement with the fact which has been given in evidence before a Committee of this House, that at the time when the Government bought the shares of the Orissa Company at 100, and distributed 50,000 *l.* amongst the directors and officials of the company, as if they had made a particularly good bargain, the shares were quoted at 60, and were unsaleable at that price?—I do not know anything about that part of the transaction; I was in India at the time, and it was left to the authorities in England to carry out the bargain.

1027. It was done entirely by the Government at the India Office, was it not?—The Government of India recommended that the purchase should be made and that the company might receive the full amount of all the expenditure upon their work, and 50,000 *l.* as a bonus.

1028. That was not recommended by the Government in India, was it?—It was recommended by the Government of India as the sum which they were willing, if necessary, to give for the transfer.

1029. You do not know any reason why the Government recommended the purchase, at this time when they were really buying the shares of a company at par and giving 50,000 *l.* premium, when its shares were really unsaleable; do not you think that the Government of India were aware at the time that they were dealing with a large expenditure of money like that, or they might have been instantaneously aware of it, by taking the obvious course, this being a public company, of looking at any ordinary stock and share list, or telegraphing to London for the price of the shares, do not you think that they took that ordinary precaution?—I think that part of the business was left to the authorities in England, as being much better informed upon the subject than we were in India.

1030. Then I understand you to say that the Government of India, looking upon it as a financial transaction, recommended that this company should be bought on particular terms, and they never took the trouble to ascertain what, at the time, was the market value of the property which they thus advised to be bought?—I think they left it to the authorities at home who were much better informed upon the subject.

1031. But the evidence which was given before the previous Committee shows very clearly that the Government of India had nothing whatever to do with the terms on which this company was bought, that they recommended the purchase, but not the terms; can you produce any evidence, I mean official documents, to show that the Government of India recommended the purchase on those particular terms?—I had the Despatch with me last Thursday, but I have not got it to-day, in which the Government of India addressed the Secretary of State in the year 1868, I think.

1032. But still, whoever is responsible for it, whether the Government of India, or the Government at the India Office, the Secretary of State, it is clear, is it not, that if these shares are unsaleable at 60, an extravagant price was paid for them, buying them at 100 and giving 50,000 *l.* amongst the directors and officials?—If it is a fact that they were unsaleable at 60, which I am not aware of.

1033. I think I asked you if you could furnish the names of the directors of the Orissa Com-

Major Gen. *Dickens*, C.S.I.

28 March 1878.

Mr. *Fawcett*—continued.

pany at the time of this transaction; could you do so now?—I think the names of the directors were given in evidence before the previous Committee on Indian Finance.

1034. Have you got them here?—I have not brought them with me.

1035. Do you know them?—No; I do not know them.

1036. With regard to the Madras Irrigation Works, you have attributed, so far as I understand, the failure of the company, to the fact that the natives are somewhat prejudiced, and will not use the water; I think you used in your last evidence the expression "prejudiced and ignorant?"—In some cases. In this particular case I know very little about it; I understand that they have shown unwillingness to take the water, but I do not know whether they are right or wrong in that particular case.

1037. Will you turn to page 62 in that volume of the "Moral and Material Progress of India;" if you refer to the passage which I have marked there, I think you will see it is stated that the failure of those works is owing to the want of engineering skill, and to the faulty construction; that, in fact, the banks of the canal have been so badly constructed that they are not strong enough to hold the water if the canals are made sufficiently full?—The passage is: "The scheme was to continue the canal down the Ponnár Valley with an anicut in the Somaishweran Gorge to the Sea of Krishnatpatam. The canal is completed from Sankasala to the Ponnár, 143 miles, but not so as to be capable of bearing the full amount of water, owing to weakness of construction. Another defect is, that sufficient water way is not provided for the passage of flood water, either under the canal, or by surplus weirs in its banks for the escape of storm waters entering it when full." What I understand is, that the irrigation has not even used the water which the canal will admit, so that the nature of the construction so far does not affect the question as to the water being used.

1038. But still, if it was wanted to use it, the construction is so faulty that it could not be used?—I do not know how far the construction is intended to be final, or whether it is in a state of progress, in carrying out what has not been actually completed.

1039. The faulty construction is very distinctly indicated there, is it not?—Yes, and we have some reports of defects in the works, but I do not think that they extended so far as this Report would lead one to suppose.

1040. What do you make, according to your statement, the aggregate loss of this company up to the present time?—I gave the figures in my former evidence, 811,751 *l.* 19 *s.* 10 *d.* was the amount paid on the 5 per cent. guarantee; 49,200 *l.* was the amount paid on account of deficiency of receipts to meet the working expenses; and 208,854 *l.* loss to the Government in the shape of interest on the advances; that makes a total of 1,068,000 *l.*

1041. But then that does not include the balance of the 600,000 *l.*, which they advanced; it is only the interest, but not the principal sum?—No.

1042. Then that has to be added, has it not?—It is part of the capital of the company.

1043. What I mean is, does the company at the present time not pay its working expenses?—No.

Mr. *Fawcett*—continued.

1044. And the Government has advanced 600,000 *l.*, of which they have had 240,000 *l.* repaid on a security which does not pay its working expenses?—That depends upon what could be made of the works afterwards.

1045. In order to get at the actual transaction, at the present time that amount clearly has to be added to the amount which this scheme has cost the Government at the present time?—Yes, provided it cannot be repaid.

1046. But it has not been repaid yet?—It has not been repaid yet.

1047. As the bargain was distinctly that if the company did not pay its working expenses, the company should be at the loss, and not the people of India, what reason induced the Government to be generous with other people's money, and let the loss fall upon the people of India instead of upon the company?—I am not aware; those transactions were between the Secretary of State and the Madras Government, and they were carried on without consulting the Government of India, so far as I am aware; I may say that the Government of India brought the subject to the notice of the Secretary of State, and after that the payment of the expenses by the Government ceased.

1048. Do you mean the Government of India or the Madras Government?—The Government of India brought it to the notice of the Secretary of State that the Government was paying the working expenses of the company, and it was desirable that it should be discontinued, and after that it ceased.

1049. With regard to the Elphinston Land Company which you have referred to, was that transaction brought under the notice of your department when you were in India?—It was, but I was not in India at the time the land was purchased; I was in India afterwards when the arrangements were made with the Port Trust, to which I have referred in my evidence.

1050. Do you remember the financial default of that purchase, or would you rather not give evidence upon that subject?—I was in India when the arrangements of the Port Trust were made, but the purchase was made before I was in office.

Mr. *Hardcastle*.

1051. With regard to the supposed deterioration of the natives, under British rule, which I understood the honourable Member for Hackney to refer to, in Question 975, and with reference also to those large native engineering works, I want to ask you, whether, as a matter of fact, those large engineering works were not made in a somewhat remote antiquity?—The construction of the dam in Cauvery appears to be a very ancient work indeed, and is supposed to have been of the time of a certain Rajah Veeranum, in the second century of our era. The work on the oldest part of the Western Jumna Canal, was constructed in the time of Feroze Toghlak in 1351, with an intermittent supply of water from the Chattang river. It ceased to flow after something less than 50 years, and was restored by Akbar in 1567, with a perennial supply of water from the Jumna. The canal was extended to Delhi, in 1626, by Ali Mundar Khan, a famous engineer and architect, under the

Mr. *Hardcastle*—continued.

the Emperor Shah Jehan. The Eastern Jumna Canal was constructed by the same Ali Mundar Khan, but appears not to have been in work, as I have already said, for more than one year. It was attempted to be re-opened in 1780, by the Rohilla Chief Zabita Khan. But there were no signs of irrigation in the southern part, and no masonry work of any kind, so that we may conclude that after the first opening, which is said to have been followed by great injuries to the towns of Behut and Saharunnpore, the attempt to maintain the supply was abandoned.

1052. Then no great value can attach to the native part of that work?—No.

1053. Speaking generally, were there any important native works wholly constructed within a century of the commencement of the British power?—Not that I am aware of; there were a great many minor works, and no doubt very valuable works, as I have already mentioned in reading those extracts, which the honourable Member for Hackney referred to; but there are none of the works among the large works, classed as extraordinary, for which we keep Capital and Revenue Accounts.

1054. Were those small native works constructed within a very recent period preceding the British occupation?—I think it may be said, as a rule, that the time preceding the British occupation was a time of great turbulence, and the extension of irrigation did not proceed much at that period.

1055. With regard to Sindh, I understood the honourable Member for Hackney to say that there were important towns which had fallen into ruins, and also abandoned irrigation works in that district, have those towns fallen into ruins and those irrigation works been abandoned recently, that is to say, under the British occupation of that part of India?—No; the discovery of those towns and irrigation works is rather considered as an antiquarian discovery of a recent date; they were not much known, till lately They were mentioned by travellers, and so on, but they were abandoned at some very old date.

1056. You do not think there is any reason to suppose that the natives of India have deteriorated under British rule as compared with their condition before the English occupation of the country?—I do not think so, so far as I have had an opportunity of judging.

1057. Is it not reasonable to suppose that the large irrigation works under the old governors of India were made by the forced labour of the natives?—I really do not know whether it would be correct to call it altogether forced labour; in some cases it may have been so, but it was customary for people to give their labour without payment, or for only a very moderate payment.

1058. Is there any such custom existing now?—I think it has been abandoned pretty generally now.

Mr. *Agnew*.

1059. As to the great number of small tanks which you spoke of, do you consider that those small tanks would be efficacious for the prevention of famine?—I think they would be very useful in a case of slight drought, but in the case of a famine, such as that which occurred last year, I think they would all be dry.

Mr. *Sampson Lloyd*.

1060. In the beginning of our examination to-day you stated that in a certain part of India, the native work produced a million and a half gross wet revenue, of which one-half was due probably to the tanks. I want to ask whether the system of irrigation derived from those tanks does not depend to some extent, or to a great extent, upon local rains?—Yes.

1061. And therefore not permanent in their beneficial effects?—Quite so.

1062. Also in Sindh, and probably in some other parts of India, are not those small native works dependent for their good effect upon occasional inundations?—They depend on inundations which, as a rule, occur pretty regularly every year, but in some years the inundations may fail, and the water will not rise to the required level, and then of course the irrigation from these canals does not take place.

1063. Would not the effect of that be that at the time when irrigation was most wanted by the cultivator, those native works would fail?—They might do so, and also each individual work is liable to fail from some set of the river closing up its head, and preventing the water from passing down it.

1064. In bearing these facts in mind, I want to ask you whether you think the native works referred, are really less useful and more costly, taking them altogether, than our own?—We have ourselves imitated the natives in respect of those works, and have constructed many canals exactly on the same principle, and it is a question how far it would pay to construct works in those localities with permanent heads and dams, and so forth, to secure irrigation.

1065. My question rather leads to this point, whether if the Government of the day had a choice of carrying out, at a less cost, works similar to those native works which are only partial in their effect, and with occasional expense in opening out the channels and so forth, they would not still have deemed it wiser to have constructed large works, even though those were more costly than to have imitated the natives in the works which have been referred to?—No; I think in those cases where circumstances are suitable for inundation canals, and where those simple works are feasible, it is an open question as to how far more costly works would be desirable, but inundation canals would not be feasible in the cases in which the great canals were constructed by the Government of India in a different kind of country.

1066. Bearing all these considerations in mind, what policy would you recommend for the Government of India in the future, as respects irrigation; would you recommend for the future small works with a partial effect such as the natives have constructed, should be constructed simultaneously with the larger works, or that we should confine our attention chiefly to large works which are permanent?—I think both, according to the wants of the different localities.

Mr. *Hardcastle*.

1067. When was it that a million and a-half of revenue was produced?—In 1852.

1068. After how long a period do you suppose those native works produced this million and a-half; was it after 50 years' experience, more

Major Gen. *Dickens*, C.S.I.

28 March 1878.

Mr. *Sampson Lloyd*—continued.

or less?—Some of them had been in existence from time immemorial.

1069. So that they were as long a time in producing those works, or rather longer, than our works have been?—Yes.

Mr. *Onslow*.

1070. At page 56 of the Blue Book which has been presented to the House on the Moral and Material Condition of India during the year 1872-73, I find this remark regarding native canals in Sindh: "Some of the largest canals were at first natural channels, others were dug by various rulers of Sindh; they are rude and simple expedients which attain their object, though less perfectly, and at greater cost than if they had been constructed on sound principles"; do you agree with that remark?—I think it may apply in some cases, but I do not think that one can give that as the description generally. In some cases the less complicated and simpler works may be the best.

1071. I want to know how it is ever possible to get a proper financial result of the profits arising from those canals, if the water rent which is paid in some parts, and the additional sum which is estimated in others, goes altogether to land revenue?—I think it is not possible, and the new form of account which the Secretary of State has lately sanctioned, will prevent for the future.

1072. At the present time, no money which is paid for water rent goes, does it, under the head of land revenue?—No, the water rates are distinct from land revenue, although the enhanced land revenue due to irrigation has hitherto been included with the rest of the land revenue, and undistinguished as being the earnings of the canal.

Chairman.

1073. You were asked whether this statement exhibiting the moral and material progress of India had any signature to it; is it not a matter of fact that in the preface, it is vouched by Mr. Markham's signature?—Yes; I did not notice that.

1074. In the concluding paragraph about irrigation, which I think stands both in the Report of 1871–72, and in the Report of 1872–73, the compiler uses these words with reference to the present state of things, After describing the policy of the Government and the creation of a new officer, the inspector general of irrigation works and irrigation secretaries in Bombay and Madras, and similar offices in the North West and in the Punjab, the writer ends with this paragraph: "Thus very great activity has been shown in the prosecution of works of irrigation; existing works have been watchfully maintained and extended, numerous important projects have been matured and commenced, and efficient machinery exists for the continuous prosecution of these great undertakings." Do you concur in that opinion?—Yes, quite.

1075. And you would read the whole of this *precis* of the history of irrigation works in India originally compiled in 1871–72, and corrected for 1872-73 by the light of that summing up, I presume?—Yes; I think the Report, as I have said has not been submitted to the Public Works Department of India for detailed approval; I have no doubt that in the main it is generally correct, but I would not accept it as a correct

Chairman—continued.

statement of any engineering or professional points regarding irrigation.

1076. But whatever criticisms there may be, whether upon British policy or upon engineering works, you would read them with a general agreement in the opinion of the writer, be it worth more or less, that the present policy is a sound one, that great activity has been shown in the progress of irrigation works, and that efficient machinery exists for their continuous prosecution?—Yes.

1077. One question as to the Orissa works, this is how the case is summed up at page 67: "The three great weirs had already been constructed by the company, and have since been maintained in perfect order and security. But there is a want of appreciation of the value of irrigation on the part of the cultivators of Orissa; the available supply is even now out of proportion to the demand, and there is a disposition only to resort to irrigation when the rain fails." Then, after some details: "The assessments were disputed at every step, and howling mobs followed the canal officials representing their grievances. There is indeed a story that the ryots were charged for water rates when banks burst and the inundation damaged their crops. Demand after demand had to be abandoned, and finally the nett income in Orissa, on account of irrigation for 1871-72 was only 1,772 *l.*, out of an original demand for 12,982 *l.* The Oorayas are slow and conservative, but at the same time shrewd and suspicious, and the Lieutenant Governor considers that they must not be harassed by charges, and that the water rate must be settled for a period of years, five at least;" do you concur in that opinion?—I think there was mismanagement in the first introduction of the irrigation, no doubt; and it was necessary to be very cautious in introducing it, and making the charges.

1078. In your former evidence, you were asked some questions about the compound interest; what I suppose you meant was that, in assessing the capital which had been settled to be the fair capital to attribute to irrigation work, the interest, while the works were not producing revenue, had been calculated as simple interest and not as compound interest?—Yes, that the interest had been taken in a continuous account from the commencement of the works to the present time; the accumulation of the account was not stopped at any period.

1079. But in settling for the last financial year, how much of the general revenues of India should be attributed to public works, you arrived at that in the remunerative public works, by adding simple interest and not compound interest?—Yes, the accumulation at simple interest.

1080. When you had to accumulate the deficiency of the profit on the works to meet the interest on capital, you added it up by the method of simple interest, you did not calculate it on compound interest?—Yes; that was the course on which we acted.

1081. But having once struck a balance and settled this figure of what has been produced in the first year, that question will not arise again?—No. I understand that in the accounts in the form which I presented to the Committee, the Secretary of State has deliberately decided that the capital shall be taken simply as actual capital outlay, without interest.

Chairman—continued.

1082. Do you mean to say, that in future, if the work does not pay, it will be charged on the revenue of the year, and not charged on the Loan Fund or *quasi* Loan Fund?—Yes; I understand that it will be charged on the revenue of the year.

1083. The loss, therefore, will fall on the people, and the capital will remain the same?—Yes; that I understand is the principle upon which the accounts are to be made.

1084. As would be the case in a public company, where the capital was share-capital; but not as would be the case in a public company where the capital was loan capital, and any unpaid interest on the loans had to be funded?—Yes.

1085. That is the decision of the Secretary of State?—As I understand, the point was not discussed in the papers which were shown me, connected with this account, but the form of the account is such as to show that it is so.

1086. You expressed an opinion that no sinking fund was necessary in connection with these public works, may I take it generally that you mean that they are of such a permanent character that so far as we can foresee, we have not to provide for a reduplication of works, with the same object, but of a different kind?—Yes; I mean that whatever repairs and restorations are required may be charged to working expenses.

1087. And that would apply both to irrigation works and railways?—Yes.

1088. You would therefore rather follow the British system, which looks upon railways as perpetual than that of some continental governments, which look forward to the time when there may be some entire revolution of the methods of communication?—Yes.

1089. You were asked whether, in computing the profit upon those works, any regard should be had to the charge for pensions; do I understand you that, in your opinion, no account should be taken of pensions in that calculation?—No. The question has been under discussion between the Public Works and the Financial Department of the Government of India for some time, and no decision has been arrived at, or had been arrived at up to the time that I left India; but what I wished to say was, that any charge of that kind would be so moderate that it would not really affect the financial aspect of the question.

Chairman—continued.

1090. Do you say that upon a general comparison between the pension list either of India or of this country and the salary list, or on *à priori* considerations?—On computations made in the financial department of the Government of India in the way that an actuary would make such computations of the value of pensions.

Major Gen. *Dickens*, C.S.I.

28 March 1878.

1091. If an actuary arrived at a certain percentages which ought to be added to meet the pensions, would it be your opinion that that should be added in the computations?—Yes; I think that would be very fair.

1092. Therefore it would be right, having actuarily decided what additional charge the pensions involved, to charge that before estimating that the works produced such and such a profit?—Yes; they should either charge it on capital, or what I think better, would be to consider it in the light of charges to the Public Works Department on money borrowed.

1093. Whichever way it is done, it is an item in the account which ought not to be neglected?—I think so.

1094. I suppose the annual general superintendence of the Government of India would be too small an item to be worth bringing in?—Yes, I think it would.

Sir *George Campbell.*

1095. Is Roorkee properly a native college; are there not a large number of Europeans there?—There are several departments, a Native and a European Department, and a mixed department also. Referring to the returns for 1872, I find there were 127 students in all, divided thus:—

	Europeans.		Natives.	Total.
	Military.	Civil.		
Engineer Classes -	3	10	1	14
Upper Subordinate Classes.	27	8	17	52
Lower Subordinate Classes.	- -	- -	61	61
Total . - -	36	13	79	127

Sir George Campbell, K.C.S.I. (a Member of the Committee); Examined.

Chairman.

1096. Will you be good enough to give the Committee an outline of your service in India?—I may say that from the year 1843 onwards, I have served in all the grades of the Executive Civil Service, from the lowest to the highest, in the North Western Provinces, in the Punjab, in Oude; and after that service in Oude, circumstances occurred which led to my being made a judge; I was for some years a judge, and in that capacity I was employed on some commissions of inquiry, and especially as President of the Commission of Inquiry which was appointed after the Orissa famine to inquire into that calamity, and to make recommendations on the subject. Then I served in the Central Provinces, and latterly in Bengal. During my service as Lieutenant

Chairman—continued.

Governor of Bengal, the famine of 1873-74 occurred, and I had further occasion to give attention to that subject. I have not had any direct connection with the Presidencies of Madras and Bombay; I have only visited those Presidencies for purposes of inquiry and information. I may add that after my return to this country, I served for a time as a member of the Council of India in London.

Sir *G. Campbell*, M.P., K.C.S.I.

1097. As to Bengal, the North Western Provinces, and the Punjab, you have had a very large and varied experience?—A very considerable experience for a good many years.

1098. Can you give the Committee any evidence as to your view of the advantages or disadvantages of constructing public works in

Sir *G. Campbell*, M.P., K.C.S.I.

28 March 1878.

Chairman—continued.

India with borrowed money; and, first, as regards works other than those directly designed for the prevention of famine?—Perhaps in answer to that question, the Committee will allow me first to run over some of the special works and special questions in regard to which I have had personal experience. In the early part of my service my experience of the Public Works Department was not, I may say, direct; that is to say, I was not directly responsible for the administration of that department; and those were times in which, what I may call the old sytem, prevailed, under which public works were constructed out of revenue, or out of the immediate resources of the Government of India, and the system of special loans and extraordinary account was not brought into vogue. My experience of that system was that it certainly very much conduced to economy. In those days, notwithstanding all that has been said to the contrary, it is certainly the case that public works of very considerable importance and of great benefit to the country were constructed. There being no extraordinary fund to which to resort, it was necessary that the expense of those works should either be borne by the revenue of the year, or should appear as a deficit in that revenue. The consequence was that very great economy was exercised in those days, and the only accusation which has been brought against the administration of those times, was that this economy was sometimes carried to the point of niggardliness and that the country was not sufficiently developed by public works. I am bound to say that in my experience it certainly is the case that, while the advantages of economy were great, there were also considerable disadvantages, inasmuch as, owing to that system of constructing works from the revenue of the year, it was not possible to enter advisedly into a great expenditure upon the scale upon which works are now undertaken. On the contrary, the system then was to construct public works, if I may so express it, by driblets; that is to say, according as the finances of each year admitted of money being devoted to public works, so that money was distributed amongst the various Presidencies and various parts of India, but there was no sustained scale by which the different works were estimated as a whole. They were carried to completion with regard to the circumstances of each particular year. Perhaps I might illustrate that state of things by the case of the Grand Trunk Road, leading from Calcutta to the North-West of India, which has always been considered one of the greatest achievements of those days of the Company's rule, when works were constructed out of revenue. The part of that road which leads through the North-West Provinces and extends for several hundred miles, leads through very easy country, where scarcely any bridging was required, and where metal was abundant. That part of the road was constructed in those days out of revenue, and was very successfully constructed, and was a very great benefit to the country. But in order to complete the whole scheme of that road, two things were necessary; one was to connect the North-West Provinces with the Punjab, and another to connect the North-West Provinces with Bengal. As regards the connection with the Punjab, there was a part of that road where the waterflow was very heavy, and where the engineering work was very difficult, between Kurnaul and Umballah. That is a part of the country of which I had much experience in my early days. I went up to that part of the country in the year 1846, and I found the state of that part of the road at that time to be this, that immense mounds of earth had been thrown up which had the effect of spoiling the old road without giving the public the benefit of any new road. So far as I could learn, that state of things had existed for a good many years previous to my first knowledge of it; and it is certainly within my own knowledge that that state of things did exist for another 20 years subsequent to the time when I first became acquainted with that part of the road; and eventually this happened, that that difficult part of the road was finished; and the last bridge over the most difficult stream was constructed and opened just about three months after the railway was completed, which rendered the road almost useless. Then, as regards the part of the same road connecting Bengal with the North-West Provinces, I also as a traveller have had very many years' experience of that road. I was once with my whole family very nearly drowned in a very rapid stream which was unbridged upon that road, and therefore I took a particular interest in it, and having for so many years experienced the difficulties of that road, it did strike me as a very unfortunate circumstance that soon after I assumed the government of Bengal in 1871, I was called upon formally to open a very large bridge over this river in which I had been so nearly drowned, which cost a very large sum of money, but which was in fact opened after not only the railway had united the North-West Provinces with Bengal for some years; but a very short time after what is called the chord line had been opened, by which even the local traffic of that part of the country was taken away, and the great expensive bridge which I so triumphantly opened, was really rendered almost useless. This was near Raneegunge in the year 1871, the great bridge over the river Barakur. However, my impression decidedly is, that it would have been better economy if that great trunk road could have been estimated for in the beginning, and if it could have been constructed 20 years before the railway came, and if the communication could have been used during the whole of that time. Then it certainly is within my experience that under this system of constructing public works from revenue, there were a good many times when the works were stopped on account of a want of revenue, and no doubt sometimes too little was done, and considerable injury to the public resulted. On the other hand, I also have found that when the system of loans for public works came into vogue, when the wave of public opinion, if I may so express it, went to the other extreme, when the cry was excessive for public works, I think that that led to a great deal of extravagance, and especially that was the case in the days before the localisation of finance, which Lord Mayo affected, was carried into practice. Because in those days the state of things was somewhat this, that the whole responsibility for the finances of India rested with the Government of India; and the local governments, I may say, got as much out of the Government of India as they could. It was almost the duty of each local government to do the best it could for

Chairman—continued.

for its own division of India; and the practice was to throw at the head of the Government of India, if I may so express it, as many schemes as possible; it was a sort of haphazard what schemes were sanctioned, and what were not; but each government got as many as possible. When I had occasion in 1871, as the head of the Government of Bengal, to carry into effect the system of localisation introduced by Lord Mayo, under which a single lump sum for public works was given to each of the local governments, and the local government became responsible for its distribution, when I had occasion to carry that system into effect, I certainly became aware that under the system which had previously prevailed up to 1869 or 1870, very many works had been undertaken, which, if regard had been had only to our real necessities and our local responsibilities, I think, could not have been justified; that is to say, they were works which either were not sufficiently remunerative to the public to justify the expense, or they were works too numerous and too large, which could not have been undertaken within a reasonable time by the funds at the disposal of the Government. Those are the evils which struck me as having resulted from first, the old system, and, secondly, the too extravagant use of the new system.

My first special experience, as being responsible for the outlay of money upon great public works raised by borrowed money, was in the Central Provinces, of which I became Chief Commissioner, I think, in the year 1867. The most important, or, at all events, the most notable, or most notorious of the works for which I then became responsible was that of the navigation of the Godavery, regarding which, I think, evidence has already been given to the Committee. And I have had an opportunity of seeing a paper which has been put in on the part of Sir Arthur Cotton, in which he goes into that particular case, and perhaps, as I had occasion to look into that work very particularly, it may be desirable that I should explain to the Committee my views regarding it. I have no information regarding the early history of the Godavery scheme. The Committee will see the River Godavery coming out near Masulipatam. I do not know whether Sir Arthur Cotton, who was the designer of this project, did personally examine the works or not, or whether he acted merely upon general principles; his principle being that, wherever there is a river, it ought to be made navigable. At all events, this I know, that the scheme was very much pressed upon the Government of India by the home authorities, and, I may say, by public opinion at home acting upon the home authorities; because, at that time, Sir Arthur Cotton was considered to be a very great authority upon these subjects. He had a very strong opinion regarding the necessity of carrying on these works, and his opinion had very great weight with the public and with the authorities at home, and I think I may say, practically for many years, the general result was, that those works were from home pressed upon a Government of India somewhat unwilling to carry them out, as doubting their advantages.

1099. About what date was this?—This is really all prior to 1867; I am merely giving my general impression. Personally, I know nothing of the early history; but I found that

Chairman—continued.

Sir *G. Campbell*, M.P., K.C.S.I.

28 March 1878.

that was the state of things in 1867; that the matter was very much pressed upon the Government of India from home, and the Government of India evidently felt itself bound, in deference to the orders from home, to carry on the works. When I, who as Chief Commissioner of the Central Provinces, was the executive authority by whom they were to be carried out, came to look into the question, I found this, that whether Sir Arthur Cotton or anybody else had examined those works as a whole, before they were undertaken, there certainly was in fact no detailed and complete estimate for the works as a whole. The information did not exist. What we found was this, that it had been the habit to speak of the three barriers upon the Godavery, the idea being that if those three barriers could be overcome by engineering works, the river would become navigable, and that would give a magnificent water highway from the Bay of Bengal, at Coconada, right up into the central part of India. Of those three barriers there was no doubt that the first could be overcome by engineering works, and in fact considerable progress had been made when I assumed the charge of those works. As regards the second barrier, I believe that there is also little doubt that the difficulties can be overcome by improvements much greater and works much more expensive than had been supposed; but although a considerable amount of work has been done upon that barrier and considerable expense incurred, it has never yet been completed, because when we came to go into the matter, we found that what had been generally designated as the third barrier, was in fact a large portion of the river, I think upwards of 50 miles, the whole of which was entirely unnavigable, and in the course of which the river descended several hundred feet. The result of the engineering inquiry which I caused to be made was that it was only possible to overcome that barrier by carrying a very expensive canal right round that part of the river, and that a very heavy lockage would be involved by which not only a very heavy expense would be incurred, but a very large subsequent expense in the use of the canal for navigation would be necessarily involved. I found that the expense of that part of the work had never been properly estimated at all, and it was quite certain that it would be very large indeed. Then we also on inquiry came to this conclusion, that although no doubt the navigation of the lower part of the Godavery, which was opened up by the completion of the first barrier, would to a certain extent be useful to the part of the country immediately adjoining, and possibly might lead to a considerable trade with the Nizam's territories upon the right bank of the river, yet the whole of the country upwards, soon after the first barrier, till you passed the third barrier, was a jungle, almost uninhabited, and of a very little productive description, so that it was quite impossible that the navigation in that part of the river through local traffic, could in any degree pay, or could in any shape recompense us for the very large expense which must necessarily be incurred. And in brief, we came to the conclusion that it would be utterly useless to finish the second barrier unless we were also prepared to complete the works, to circumvent, if I may say so, what was called the third barrier, which as I said, would be very expensive, and very difficult indeed, and would no

Sir *G. Campbell*, M.P., K.C.S.I.

28 March 1878.

Chairman—continued.

doubt involve a very large continuing expense, though so far as I know, the actual figure has never been, or at least it was not arrived at in my time; that being so we had to face the fact which General Dickens has already stated to the Committee, that whereas the original rough estimates did not go beyond 300,000 *l.*, the sum of 700,000 *l.* had been expended on a comparatively small part of the undertaking, that is to say, the completing of the first barrier on a scale much smaller than the original design, and partially completing the works upon the second barrier; and we had to consider whether, if that 700,000 *l.* were increased to a sum which might probably have amounted to a couple of millions at least, the navigation which would result would justify that very large expense. We had to consider that which I have already stated, that the river, or a great part of the river, ran through a country very little inhabited and very little cultivated; that the profit of the canal, if ever there should be a profit, must depend not upon that local traffic along the banks of the river, but upon the Central Provinces in which the canal was, by Sir Arthur Cotton's design, to eventuate. If the Committee will look at the map, they will see the Central Provinces marked. Nagpore is about the central part of India. The great and valuable product of that part of the country is cotton. I think I may say that quite the finest cotton in India is produced in that Nagpore country, what is called Hinganghât cotton. If the Committee will look at the map, they will observe that that cotton country is about equidistant from Bombay on the one side, and from the mouth of the Godavery on the other; perhaps, if anything, it is rather nearer to Bombay; but that cotton is very valuable cotton, and cotton is a very valuable article. It is an article which, when it is pressed, as it now always is pressed, upon the spot, occupies comparatively small bulk; and it is an article with regard to which cheapness of carriage is not so very great an object as getting to market early, and it is one of those valuable articles which certainly will pay, and does pay the expense of railway carriage. It was the fact that a railway from Bombay to the immediate vicinity of that cotton country had already been opened when I was in the Central Provinces; and we came to the conclusion that, supposing this great Godavery canal should be opened throughout, at a very great expense, the probable result would be that still not a pound of this cotton would go by that route, because it had already taken the route by railway to Bombay, which is the great cotton market, and the great cotton port of India, and which is in much more direct communication with Europe than Cocanada, and which is a very much superior port to Cocanada; and we considered that, looking to the distance of Cocanada from Europe, and to the inferiority of the port of Cocanada, and to the expense, and the difficulty which would attend the navigation of the Godavery, it was not at all likely that the cotton would ever take this route. Then I should also say as regards the navigation of the Godavery, we found that if the works for passing over the barriers were completed, still, as a channel of navigation, it would be a very inferior channel. It never was proposed to canalise the whole river, but merely by overcoming those barriers to render the easier parts of the river available for navigation. What we found was this, that the river for four months of the year, had water enough for navigation, but for the remaining eight months it really was so shallow, and so uncertain and so impracticable, that no considerable navigation could have been carried on; whereas, during a great part of the remaining four months in which there was water enough, there was too much water, that is to say, there was an enormous stream, a stream of great violence, against which boats would have great difficulty in contending; and therefore we came to the conclusion that the traffic which would seek that way would not be a very large traffic; that the cotton of the Nagpore country would not seek that route, that there is no surplus produce of grain in that Nagpore country, and that although salt might to a certain extent, come from Cocanada, still it would only come in competition with a better salt brought by railway from Bombay. So that, taking all these circumstances into consideration, the great expense of this project, and the inferiority of the navigation which was likely to result and the want of any demand for such a waterway, the Government of India eventually came to the conclusion that it was better not to prosecute this scheme; that it would be better to rest contented with the navigation of the Lower Godavery which might possibly open up some part of the Nizam's country. I should mention that this conclusion was not arrived at until after I left the Central Provinces. A plan which I myself proposed was something to this effect: that Sir Arthur Cotton's scheme, upon which so much money had already been expended, should be divided into two, that you should complete the work on the lower part of the Godavery, and that you should abandon the work of the second and third barriers, and that you should try to render navigable the Warda branch of the Godavery, above the third barrier, and, as it were, reverse Sir Arthur Cotton's plan; that is to say, instead of using the Wurda, to bring cotton and other products to the port of Cocanada, you should use it in order to bring coal and cotton, and other products, to join the railway, which thence would lead to Bombay. However, when we came to look at the Wurda, the difficulty was this, that the Wurda, during the greater part of the year was almost waterless, and consisted of little more than a succession of poois and shallows; but then we found that Sir Arthur Cotton had a scheme for getting over that difficulty; he said it is only people ignorant of engineering who can make difficulties of that kind. There is a great deal too much water no doubt in the Godavery for four months in the year, and there is a great deal too little in the remaining eight months: therefore all that you have got to do is, to store up the surplus water for four months, and to let it down gradually, so that it may have an equally good and useful flow during the remaining eight months. Into that part of the question I also had occasion to go, but when I went into the facts, and the grounds upon which this suggestion was founded, I discovered that Sir Arthur Cotton really had never even seen the ground on which he proposed to construct his immense reservoirs. So far as I could understand, all that Sir Arthur Cotton had done was to take a map, and to define what appeared to be valleys *in* those maps, and to say, all that you have *got* to do is to make great dams over the *necks* of those valleys, and you will then be able to

Chairman—continued.

to store up the whole of the surplus water and let it down again. However we were very anxious that this question should be sifted to the bottom, and therefore we applied to the Government of Madras for engineers of what I may call the Cotton School, who might be sent to work out this scheme, which Sir Arthur Cotton had roughly designated as what we ought to do. Those engineers came, and they did all they could to work out those schemes, but it turned out, as really might have been expected of schemes thrown at us in so very rough a way, that there was no possibility of works upon the enormous and gigantic and magnificent scale suggested by Sir Arthur Cotton. The examination by the Madras engineers eventuated in some very minor projects, regarding which great doubt was entertained whether they were practically beneficial or not. So the matter stood at the time that I left the Central Provinces. I have no personal knowledge as to what became of these schemes, but this I do know, that the orders were carried out, that the Godavery works have been stopped, and that things in the Central Provinces remain very much as they were when I left.

1100. Have you had any experience of dealings with companies by whom public works have been constructed in the Central Provinces?—Yes, in the Central Provinces I have also had considerable experience with regard to dealing with companies. With regard to the Great Indian Peninsula Railway Works, which run through the Central Provinces, I have not had a very large personal experience, and the works were approaching completion when I took charge of those Provinces; but this I do know, that there were very notable and considerable difficulties experienced with regard to the contracts for the completion of those works. It turned out that a very large proportion of the bridges were what we should call scamped, whereas the contractors declared that it was the default of the engineers not to insist upon specifications for more perfect works. At all events, the result was, that a very large proportion of those bridges had to be pulled down again and rebuilt. And also this happened with regard to this work that the practice was—inasmuch as we have not in India the very large and rich contractors who are available in England—the practice was not to contract for a lump sum for which the works were to be completed, but the contractor was to contract for executing the work at certain rates; so much was to be paid for earthwork, and so much was to be paid for masonry, and so on.

1101. At what you call a schedule of prices?—Yes, but it so happened that the schedules of prices were so arranged that the earthwork was very profitable to the contractors, and the masonry was not profitable, and what resulted was this, that the contractors were in a very great hurry to complete the earthwork, and they did complete the earthwork, which was very profitable indeed, but when it came to the masonry, they drew up and said, "These rates will not pay us, we cannot go on; we will throw the works upon your hands," and the Government were forced to revise the rates under circumstances which I thought were hardly fair.

Then there was the Nerbudda Coal Company, with regard to which the Committee have already

Chairman—continued.

heard something; the circumstances were these; in the upper part of the Nerbudda river valley, a very fine vein of coal was discovered; that vein of coal was not discovered by this Nerbudda Coal Company; it was discovered before my time, and I do not know who discovered it; but at all events in those days the idea was that the resources of India were to be very much developed by companies, and a company came forward which offered, on consideration of some large concessions, to undertake the working of this coal; the concessions were that all the coal that might be discovered in a large tract of country should be conceded to this Nerbudda Coal and Iron Company. The company undertook to work the coal, and they undertook also to work the iron ore, which was abundant, and to develope the sources of the country in regard to iron. It was laid down in their contract that within a certain period they should actually produce certain large quantities of manufactured iron, which were specified in the schedules. But when we came to the working of the company, what we found was this, that the company, although it had acquired fame and notoriety, never had very much capital, and they contented themselves with seeing what profit they could derive from the mine which was put into their hands without any finding on their part. They had not the capital by which to construct a railway, or a road connecting that mine with the system of the Great Indian Peninsula Railway, which was likely to be their principal customer; also they did not care to risk their money, I do not think they had much money to risk, on experiments with regard to iron which in other parts of India had not been very profitable; so that while I was in the Central Provinces, although the company did their best to raise the coal in a small way, they had not succeeded in bringing it efficiently to market they had not succeeded in bringing their works into direct communication with the Great Indian Peninsula Railway, and altogether their operations were on a very small scale. Subsequently, I was told, and I know it was the case, the Government, finding the company could not execute the works which were necessary to bring this coal to market, did execute the work, and I think a branch railway has been constructed to the coal works at the expense and at the risk of the Government, and in that way the coal has been brought to market, while the profit of the coal, if there be any profit, still remains with this company.

1102. Was the railway constructed by the Government themselves, or by the Great Indian Peninsula Railway, under their guarantee?—I think it was by the Government that that branch was constructed, but I am not quite certain. Then I had again experience of this company when I was a member of the Council of India. If Lord George Hamilton had been here I should have asked his permission, as I am not strictly at liberty to disclose anything that happened in that Council, but I shall touch only upon matters that are pretty notorious, and perhaps I may exercise a certain discretion. What I found when I was a member of the Council was this, that the time had come in which the company were bound to fulfil their iron contract with regard to the completion of the iron works, and the manufacture of iron, and all the rest of it; but they had done nothing of the

Sir *G. Campbell*, M.P., K.C.S.I.

28 March 1878.

Chairman—continued.

kind, and therefore the Government of India very strongly recommended that the concessions which had been accorded to them should be cut down to the lowest point; that inasmuch as they had failed, either to discover coal beyond the original vein, or to work the iron which they had promised to work, their whole concession should be revoked, excepting only the coal mine which they were working. But I found that it was very difficult to deal with a company of this kind; and that they were ready with a very great many reasons why the Government should not treat them too harshly. In this, as in other cases, it is very apt to happen that the principle on which the company goes is what is vulgarly expressed by the maxim, "Heads I win; tails you lose;" that is to say, as long as there is a profit made the company claim the very utmost that it can, and when there is a loss an appeal is made in a sort of *ad misericordiam* form to the Government. My impression was that the Government was then entitled to say to the company, "We have the law of you; we have the justice of you; and we will give you what terms we like." But I found that, inasmuch as in this country it is necessary to be conciliatory towards commercial bodies and moneyed interests, and so on, the Government at home were not able to take the strong position which the Government of India wished them to take; that, in fact, they found it necessary to negotiate with the company, and, to a certain extent, to satisfy the company. I left the Council of India; I do not know what was arranged, but I certainly came away with the impression that it was very difficult to deal harshly with a company of this kind. Then there was another case of a coal company in another part of the Central Provinces, where a very large deposit of coal had been discovered. I found that before I took charge of the Province a company with a fine name had demanded a concession of this coal, and correspondence had been going on, and it seemed likely to eventuate in those large coalfields being conceded to this company; but before the contract was finally made, I, not being altogether favourable to this system, thought it might be as well to inquire a little into the nature of this company, who the company were with this fine name, and all about it. I traced it to Cawnpore, and I found out that it was not a company of English origin, but a company that originated in Cawnpore; and when I came to inquire at Cawnpore who the members of the company were, I found that they consisted of two persons who had not been successful in some small contracts for public works upon the roads there, and who finding that their credit was rather blown upon at Cawnpore had come to the Central Provinces, where they were not known, and got up this company with a fine name, and then they demanded the concession of this great coalfield. Under those circumstances, I thought it better that the concession should not be made to a company of that kind, but that the coalfield should be experimented upon on the part of the Government, who did work it; and it turned out an extremely valuable work, especially that which was called the Chanda coal, on the River Wurda. That work has I hope been very successful, and I think we have reason to be glad that that coal was not precipitately made over to a company of this kind. Then as I have said so much against the companies, I think I should also say this, that in addition to the Government works on the Godavery not being very successful, we have also in the Central Provinces some other Government works which were not very successful; there was the great bridge over the River Kanhan, at the large cantonment at Kamptee, which was built two or three times over, and was always swept away. I am not aware whether it is finally constructed or not. Then there were the Saugar Barracks which were built in the Central Provinces, and which was a case which attained some very unfortunate notoriety on account of their tumbling down again; so that the general result upon my mind was, that I came away from the Central Provinces not having a very high opinion of the Government management of public works, either in the shape of direct Government management, or in the shape of management through companies. Up to that time, my experience had certainly been somewhat unfortunate. Then I had noted down to mention to the Committee another small personal experience which I had, and which has to a certain extent been anticipated to-day; when I was leaving the Central Provinces, and leaving India as I thought for good, although I never had been accustomed to enter into any speculation, having somewat severe ideas upon the subject, as I had seen a good deal of Bombay, I thought it would give me a certain interest in Bombay if I took some small shares in some of the great works which were then going on there, and which were then at a low price; one of them was the Elphinstone Compamy. I did buy a few shares in the Elphinstone Company, meaning that they should be a permanent interest in Bombay. Six months after, to my astonishment and surprise, the works were bought by the Government, and I got back my money just double, in consequence of which I have never since ceased to throw in the teeth of the Government that they were foolish enough to buy up the Elphinstone Company for double what it was worth. At the same time, I also invested in a small way in another land company, which the Government did not buy up, and from that company I have never got a fraction, so that the double return from the company which the Government bought up has just compensated me for what I laid out in the other company which the Government did not buy up.

Chairman—continue

1103. Up to that time you found that companies under the Government did badly, except in cases where the Government bought the works from the companies?—That was my personal experience. Then my next experience was in Bengal, of which I assumed the government in 1871. My personal experience of the management of the great railways in Bengal was not very long, because some little time after I took charge of the government, the Government of India decided themselves to assume the direct charge of those great undertakings; but I did have some experience of those railways, and also I had a considerable experience of the working of them on the occasion of the Bengal famine which subsequently occurred. My experience with regard to the relations of the Government with those guaranteed railway companies was this, that the character of the relations and the pleasantness of the relations a good deal varied according to the character of the management of

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Chairman—continued.

the particular company. The Eastern Bengal Company was not a very large company, and it was one which always laid itself out to keep on good terms with the Government. We always found that the Eastern Bengal Company were ready to meet our wishes; they felt that they depended a good deal upon Government support, and on the other hand the Government received great support and assistance from them. The relations between the Government and the Eastern Bengal Company were always exceedingly pleasant, and I have no hesitation in saying that if one could insure that the relations between Government and those companies would always be such as those which subsisted between the Government and that particular company, the use of such companies would be extremely beneficial, and a considerable burden would be taken from the Government, which it is perhaps not sufficiently fitted to bear, and the public service would be benefited; but on the other hand my experience of the East India Railway was different, and not so pleasant. The East India Railway is a much larger concern; it is, if I may so express it, a prouder concern; it is a concern which affected great independence of the Government, and the relations between the Government and the East India Railway never were pleasant. On the contrary there was always a good deal of jarring; and I could not help thinking that by way of asserting their independence there was sometimes a considerable disposition on the part of the East India Railway Company not to meet the Government so fully, so completely, and so pleasantly as the Eastern Bengal Railway Company did. It certainly was also the case that at the time of famine certain inconveniences were experienced, because we had not then the East India Railway Company completely under our control. I think Lord Northbrook had a somewhat strong feeling upon that subject. The dealings at that time between the railway and the Government were principally in the hands of the Government of India, and, perhaps, I had better leave that question, inasmuch as Lord Northbrook, who I believe is likely to appear before the Committee, will be better able to explain it. There was one railway which was made without a guarantee, of which my experience was very favourable indeed. It was a small railway called the Nalhatty Railway to which allusion has already been made, and that was the first railway within my experience, which was of the character of a very cheap and a very simple line, not constructed upon those high engineering principles which had previously been considered necessary. It used to be satirically said of that railway that it was made of iron hoops for rails, and the staves of empty beer boxes for sleepers. That was not literally the case, but still it was a railway made with very light rails, and with the roughest possible sleepers, and upon the up-and-down kind of principle, going up hill and down dale, very much like an ordinary road. That railway has not been a brilliant financial success, but for practical purposes it has been extremely successful; and it was also curiously successful in another way, that, inasmuch as it was a very cheap railway, it was impossible that it could pay the cost of a very expensive management, and it fell into the hands of a native. Now, that native, I think his name was Ramguttee, turned out to be a very

Chairman—continued.

extrordinary native; a native who showed that native ingenuity may sometimes be combined with English energy. The management of that railway fell entirely into the hands of this native, and he managed it so well, and so very economically, that, notwithstanding the great difficulties, notwithstanding that the railway was an isolated railway, notwithstanding that it was looked upon rather as a step-child by the East Indian Railway, to feed which it contributed, he did succeed in making that railway almost, if not altogether, pay; and certainly the result of my personal experience of the working of that line was to impress me very favourable indeed with the plan of very cheap railways, constructed upon the simplest possible principles.

Sir *G. Campbell*, M.P., K.C.S.I.

28 March 1878.

Mr. *Onslow*.

1104. Do you remember what the length of that line was?—It was about 25 miles, I think.

1105. Were there any stations upon it?—Yes, there were some stations. The stations generally consisted of a flag put in the ground to indicate where the train was to stop. Then there was another railway, which was a very unfortunate railway, of which I saw something, and I saw the end of it as an independent undertaking. That was the Calcutta and South Eastern Railway, which is another instance of the unfortunate result which may arise from the pressure which is put upon the Government by companies. The South Eastern Railway, although made by or at least under the guarantee of the Government, was the outcome of a company which was concocted in Calcutta, and which was called the Port Canning Company. It was concocted at a time when those companies were very much the rage, and when the companies at Bombay had managed to run up their shares to fabulous sums, from which they afterwards very rapidly ran down again, and when people were very much convinced that the great thing to make their fortune was to get up a company. This Port Canning Company was got up in Calcutta, and got up by a very enterprising man, and a very plausible man, and a man who really at one time seemed likely to do great good to the country, although I understand that he has since been unfortunate in business. But, at all events, the idea was started that the Hooghly was silting up, and that Calcutta would soon be a thing of the past, and it was necessary to build a new port, that that new port was to be called Port Canning, and this new company was to develop the resources of Port Canning. Upon which they came to the Government and said, "You cannot expect us to do this for nothing; you must make enormous concessions to us. There is an enormous tract of country called the Soonderbunds, which has never yet been developed, which has been in an unhealthy state, and from which you have not got much revenue; make that over to us, and we will develop it." By putting a very great pressure upon a somewhat unwilling Government, because Lord Lawrence did not like it at first, they succeeded in getting enormous concessions. They got an enormous tract of country made over to them. But when it came to the question of the company implementing their part of the bargain, it turned out that the shares had begun to go down, and they found that the money was not sovery readily forthcoming. So that although they had

Sir *G. Campbell*, M.P., K.C.S.I.

28 March 1878.

Mr. *Onslow*—continued.

established a certain amount of cultivation, and had set up one or two rice mills, they altogether failed in developing this new Port Canning. To begin with, it turned out that the place was wretchedly unhealthy; but an immense pressure was put upon the Government to do what they said it was the function of the Government to do, and the Government were driven into the construction, or guaranteeing the construction, of the Calcutta and South Eastern Railway, which led from Calcutta into a hopeless and unhealthy jungle, and which, up to a very recent time, never has paid its working expenses. Then the company also said, "We are going to make a port; but you must go to the expense of making this port practicable; you must buoy the river leading up to it, and maintain light-ships, and guardships, with a magistrate, and all sorts of things paid for by the Government. The Government yielded to the pressure on the part of the company, and they did maintain all these things; and when I took charge of the Government, I found that a very great annual expense was incurred on account of all these things; and there you had this magnificent port, with all the apparatus of a port, and everything required to develop a great commercial interest and great prosperity, except the ships and except the commerce; for, barring one or two ships that were brought there by this Port Canning Company, no ship came there at all. And I came to the conclusion that, inasmuch as Calcutta was still there, and prosperous, and inasmuch as the Hooghly was still there, and was still used, whilst Port Canning was not used at all, there was no sufficient justification for the Government to maintain a large and expensive establishment at Port Canning; and in consequence, with the sanction of the Government of India, I may say I abolished Port Canning. The establishments were removed, and Calcutta remains prosperous; but the result is, that the Government of India is burdened with the Calcutta and South Eastern Railway. In respect of that line, perhaps I may explain that about one-half of it which goes through the cultivated country in the neighbourhood of Calcutta is tolerably useful, and perhaps may eventually be tolerably profitable, but the other half is so entirely useless that I think it has been recommended that the rails should be taken up.

Chairman.

1106. At any rate, the traffic has ceased?—Yes, on the last part it has ceased. I should also say that I am responsible for recommending the construction of the North Bengal Railway, which runs from the Ganges through a great grain-producing tract in Northern Bengal. That railway has been constructed as a Government railway, and I am still sanguine, and all that I have learned leads me to believe that that railway will be a profitable, a paying, and a beneficial one. My only doubt is with regard to the gauge upon which it is constructed; that is to say, the narrow metre gauge. The other day I saw a letter from this part of North Bengal which alarmed me very much, inasmuch as this child of mine, this North Bengal Railway, was described as nothing but an expensive plaything; but when I came to look further into the letter, I found that the grounds for this unfavourable opinion were not that the railway was not required, but that it was constructed upon so small a gauge,

Chairman—continued.

that it could not possibly carry the enormous amount of grain which would require to be carried. Whether it will be so or not, it is not for me to offer an opinion, because it is an engineering question, but I confess that I myself have had very grave doubts whether, in a plain country, as distinguished from a mountainous country, it really is much economy to have a railway of what I may almost call so pedantically narrow a gauge as 3 feet 3 inches, it being narrower than the ordinary gauge of carts or other vehicles; whether that is an economy which will repay the comparative deficiencies in the working of the line.

1107. Where is that railway from?—That railway runs from a point on the Ganges, near the junction of the Ganges and Burrampooter, through North Bengal, and eventually it reaches the Himalayas, near the Hill Station of Darjeeling. It runs through the districts of Rangpore and Dinajpore, which are amongst the most productive districts in India.

1108. Is it open to Darjeeling yet?—No, not yet.

Mr. *Onslow.*

1109. There is no bridge across the Burrampooter, is there?—No, and there is not likely to be, I am afraid.

Then, I think I should say, inasmuch as Bengal is a water country, my attention was very much directed to the question whether water carriage, in the shape of canals and improved navigation channels, ought not to be fostered, either in substitution for railways, or at the same time with railways. In other parts of India my experience of water carrriage has not been favourable, because India is a country of extreme climates. Most of the large rivers and most of the large channels are certainly what I have described the Godavery to be, viz., torrents at one season of the year for four months, and dry beds for the other eight months. The elements are all extreme. It is difficult to maintain second class works. Certainly in Northern India our canals, as works of navigation, have not been successful; but it is very different when you come to Bengal. Bengal is a deltaic country, permeated, if I may say so, in every direction by water channels. It is a country in which it is extremely difficult to make roads, and where there is scarcely any metal for making roads, and where, therefore, I think you are driven either to railways or to water carriage. It certainly is a country where you would naturally suppose that you should mainly rely upon water carriage, and for the greater part upon water carriage we do rely; but as regards the main stream of the Ganges, our experience has been that, the East India Railway running along that river, the tendency has been for the railway to beat the river, and not for the river to beat the railway. The navigation upon the Ganges is very difficult and very dangerous. It is only at certain seasons of the year that boats can sail up the stream, and when the river is fullest, and best for navigation, the storms and heavy currents render it very dangerous, and a great many boats go to the bottom. So that I think I may state, as a matter of fact, that in the competition for carriage the railway which runs alongside the Ganges has been largely gaining upon the river. But when you come into the lower part of Bengal, where there

Mr. *Onslow*—continued.

there are so many water channels, and where it is difficult to make railways, the case is different. I have alluded to the Eastern Bengal Railway; the Eastern Bengal Railway does carry a large traffic; there is a large jute traffic by the Eastern Bengal Company; but at the same time there is a great amount of competition against that railway on the part of the water channels, circuitous, no doubt, but which still reach Calcutta by a cheap fashion. We have an old-fashioned canal, which runs from Calcutta to the eastward, which is certainly imperfect in its construction, but it is used to an enormous extent, and it returns a very large profit. We have found it so in the case of some other local works which have been constructed. There is one constructed from the Ganges to the north, which leads to Dacca, and other works of that kind, which we find to have been very beneficial and very successful. But our experience has been this, that when you come to the new-fashioned canals, if I may so express it, that are made by modern engineers, they somehow seem to find it necessary to construct things on a very much more expensive scale. In that case there is the expense of constructing them, and the expense of keeping them up, and one thing and another, and it seems very doubtful whether the cheap native traffic will pay well for canals made in that expensive style. The Orissa Irrigation Company made a canal to Midnapore, which is very efficient, and I think I may say successful, for navigation purposes; but the lockage is considerable, and the locks are all on a very large and expensive scale; so that looking to that work, my only doubt is whether it really is necessary to make such expensive works, or whether in some parts of India you might not have cheap and popular works, such as I remember in my youth all about the Lea, and its feeders here near London, which certainly are not on the same magnificent scale as those which our engineers have thought it necessary to construct in India. However, the whole subject of navigation channels in Bengal is by no means exhausted, and I came away from that country with the belief that a great deal still may be done to open up and maintain the useful water channels in Lower Bengal.

Then there is a very important experience which I had in Bengal, which I think has scarcely been sufficiently touched upon, although it does very much bear upon the subject of the present inquiry of the Committee, and that is the construction of works under the Public Works Loan Act. I have not that Act by me, but no doubt it will be put in on the part of the India Office, and I may say in general terms that seeing the very useful results which have been found to accrue in this country from granting to local bodies and to individuals public loans for the construction of useful works, the Government of India, at a time when they were somewhat more flush of cash than they now are, embarked on a system of this kind. They passed the Public Works Loan Act, in passing which I took a part as an *ex officio* member of the Governor General's Legislative Council. They passed this Public Works Loan Act, under which advances might be made to local bodies. I have not the least doubt that this is an extremely useful and beneficial system under which great public benefit may result;

Mr. *Onslow*—continued.

Sir *G. Campbell*, M.P., K.C.S.I.

28 March 1878.

but also I am somewhat apprehensive that it has been used to, as it were, hide away great public works constructed with borrowed money which are not thoroughly brought to the notice of the public, and with regard to which I do not myself understand the form of account that is used. Works have been constructed under this system on an extremely large scale. We have been told that the Government of India have resolved that the heading under which works are to be constructed from borrowed money is only to be applied to two classes of work; namely, railways and great paying irrigation works. But I am aware that some other great works have been constructed with borrowed money, and when I have tried to discover where those works appear in the accounts, I have not been able to discover them, particularly with regard to the Madras Harbour and some other works, in respect of which I took a great deal of interest. I have asked several times at the India Office where the expenditure upon the Madras Harbour is to be found, and I have not been able to find it, but I have gathered from General Dickens' evidence that it is treated as one of those local works under the Public Works Loan Act. That money has been advanced to the Government of Madras to construct this great work, which seems likely it is said to cost a million and a half, and I join with General Dickens very much when he said that he very much doubted whether it would pay. I do think that the accounts should be so arranged that it should be made quite apparent what money is advanced under this system, and for what classes of works, and, in the case of some very large works, for what particular work it is so advanced. Although I have prefaced my remarks upon the subject by explaining to the Committee what was the difficulty and, to my mind, the great danger of the system, on the other hand I have personal experience of the very great benefit of the system. I have said that the system is applied not only to petty local works, but also to works upon a large scale, and the first which I would mention, with regard to which I have personal experience, is the Calcutta Port Trust. I need not explain to the Committee that Calcutta is one of the greatest ports in the world, and perhaps there is no port which is visited by so large a number of very fine ships of the first class. It is a very important port indeed, and good accommodation should be provided for it. Up to the year 1870–71 the accommodation was not of a first rate class. Ships used to lie out in the stream, and were loaded and unloaded into country boats. One enterprising and excellent engineer, a gentleman of the name of Bruce, devised a scheme by which piers and jetties should be established along the banks of the Hooghly with landing wharves, and cranes, and small railways, and all the modern appliances for the landing and shipping of goods. But that could not be carried out except at very considerable expense, and the Government having very many other things in their hands, and finding it very difficult to undertake the whole of these marine affairs in addition to the vast amount of affairs connected with the land with which they were burdened, thought it would be desirable to avoid the direct responsibility for those works and to put them into the hands of public bodies. The system under which that was carried out was this: a Port Trust was created which took over at a valuation all the existing Government

Sir *G. Campbell*, M.P., K.C.S.I.

28 March 1878.

Mr. *Onslow*—continued.

buoys and other works which were useful for future purposes, and also undertook the construction of the jetties and the modern appliances which I have described as necessary to make the port of Calcutta efficient. In order to enable the Port Trust to carry out these works, the Government agreed to advance to them, under the Public Works Loan Act, a considerable sum; I think the sum was 600,000 *l.* That sum was advanced to the Trust, and the Trust very rapidly carried those works into execution; and the result was that within two or three years from the commencement of those works, I may say an entire transformation was effected in the port of Calcutta; a transformation which was the more necessary and the more timely, inasmuch as it was coincident with the change in the commercial route which brought a large number of steamers through the Suez Canal. Now, those steamers which come through the Suez Canal are much more expensive machines than the old sailing ships. They cannot afford to spend months waiting to be loaded and unloaded as the old sailing ships did, and, therefore, it was an immense convenience and advantage to them that those jetties were prepared with all those appliances by which a large 2,000-ton ship could be unloaded and cleared in the course of two or three days. Before I left Calcutta we had got to that point that we were able to unload all those ships that came in. Up to that time we were not able to provide sufficient accommodation for loading the ships. Vessels being unloaded at the jetties still went out into the stream to be loaded from country boats. But I believe that the system has still been continued, and that it is considered by the commercial community to be very successful and very paying, so that there is not the least risk that the Government will lose by this transaction. I think General Dickens alluded to some doubts entertained by Sir Andrew Clarke with reference to the engineering question; there always will be doubts and difficulties upon the subject, because the Hooghly is a very capricious river, which silts here and silts there, and I am not prepared to express an opinion upon that point, but I think I can state confidently from a commercial point of view, as regards the accommodation of the trading community, that this loan of 600,000 *l.* has been immensely beneficial to the trade and commerce of Bengal, and that the work is very popular, and at the same time it is very paying. I forgot to mention that there is a large sinking fund, and in that way the whole capital is to be sunk and repaid in 30 years; that is paid in addition to the interest.

1110. Do you know exactly what per cent. the Port Trust are paying now?—They pay 5 per cent., I believe, and I think the sinking fund is 2 or 2½ per cent.; they pay from 7 to 8 per cent. without giving exact figures; and I should say, as regards the profits, the Port Trust would pay a very much larger profit; but, in justice to the commercial community, the rule laid down was, that this being a public trust, the charges should be such as simply to pay the cost, so that the effect of the working has been that, while the accommodation is improved, the port charges have been very much reduced, although there is a separate charge for the use of the wharves, of course. There is another costly work which was undertaken somewhat in the same way, although I have grave doubts whether it is so secure an investment, and that is the

Mr. *Onslow*—continued.

floating bridge over the Hooghly. It was the wish of the Government of India, at the time when General Strachey was Secretary to the Public Works Department, and Lord Mayo was Governor General, that this work, designed by a very eminent engineer, Mr. Leslie, should be carried out. I myself never had the least doubt that it was a very beneficial work, in many respects, to carry out; but I had grave doubts as to the expense, because I found that it was likely to cost about 200,000 *l.* for merely a floating bridge, which, to a certain extent, is very liable to accidents from time and tide and cyclones. However, it has been successfully carried out, and up to this time I believe that it does pay the Government; but I am apprehensive that if a great cyclone any day were to destroy that bridge, possibly a considerable part of the money of the Government might be lost.

1111. Is that a direct Government work?—Yes, I think it is still directly under the Government. It was desired that the Port Trust should take it, but they did not like the look of it financially, and I rather think declined. The money was lent by the Government of India to the Government of Bengal. Then going to minor works, I should say that I think that if the thing is discreetly and carefully managed, very great benefits may result from applying this system to the municipalities which we are striving to establish in India, and to public bodies of that kind; and within my own experience very beneficial works of that kind have been executed under this Public Works Loan Act; I have alluded to the Dacca Canal; that was a very beneficial work which was carried out under this system. Then there is another work which has been very successful, of a different class, which was known as the Duncoy drainage scheme. On the opposite side of the Hooghly from Calcutta, in what is called the Hooghly district, there was a large extent of land which had been swamped, and was lost to agricultural purposes, and from which the health of the inhabitants had also suffered. Colonel Haig, a very eminent engineer, who was at the head of the Irrigation Department in Bengal, designed a plan for draining this large tract, and by great pains and great perseverance on the part of the servants of the Government, the native landholders were brought to be so thoroughly convinced of the benefit which might result from a scheme of this kind, that they consented to a Local Act, which was passed in the Bengal Council, by which the cost of carrying out a scheme of this kind was to be assessed upon the land which benefited. The Government of India accordingly advanced the money required, I forget the exact amount, and that scheme was carried out; it has I believe already been successful; the money is being recovered from the landholders, and I think it will be a beneficial work. Various small works have been carried out under this system by the various municipalities throughout the country, but up to the time when I left Bengal, the amount so expended had not reached a very large sum. So long as great care is exercised with regard to the particular works for which those advances are made, I say again I have no doubt that the system will be very beneficial; but it is always open, with regard to small works as well as with regard to great works, to the risk that some day, if you have a government or a governor very much infected

Mr. *Onslow*—continued.

fected with a rage for public works, you may go too far, and you may encourage municipalities to apply for loans to make works which may seem very beneficial to the people of the present day, but which may fall heavily upon the next generation, if the works are not so successful as they were expected to be. But then this precaution has very prudently been taken with regard to all loans of that kind, that there is invariably a sinking fund attached to them, so that the money may be repaid within a reasonable time, generally from 20 to 50 years. With regard to ordinary works of a permanent character, I think 30 years is the time which has usually been allowed. That is the rule which the Government of India, with my concurrence, applied to loans for works to local governments and to local bodies, and it is upon that analogy that I have been inclined to suggest that the same rule ought to be applied to works constructed directly by the Government of India itself, that they also ought to provide a sinking fund by which the capital expended on those works may be repaid.

1112. What is the rate of interest which the Government, under the Public Works Loan Act, charge; is it a fixed ratio, varying with the works?—I think the Government are allowed to fix it, but the ordinary interest is five per cent. I do not think it is fixed by the Act.

1113. Do you say that usually the sinking fund is sufficient to pay off the debt?—Yes; the payment is calculated to be made in the form of an annual sum which will both suffice to pay the interest and to sink the capital in 30 years.

1114. Is it like the English system, a uniform sum during the whole period?—Yes, a uniform sum of 7 or 8 per cent. There was a great market constituted in Calcutta upon a loan of that kind, and works in other small towns also.

I think those are all the special experiences with regard to Bengal, other than irrigation works, which have occurred to me to submit to the Committee; but I may say generally that, while I was in Bengal, I had a more direct responsibility for public works than I had had before; perhaps I became more at one with the Public Works Department, as it were, and felt myself the more saturated with the ideas of the Public Works Department, and we flattered ourselves that our works had generally turned out tolerably well. At all events, I came away from Bengal with a much more favourable view of the Public Works Department than that which I had when I left the Central Provinces. As regards my experience in the Indian Council, there are just one or two remarks which I would wish to make. When I was a member of the Indian Council in London, in 1874, the question of those extraordinary public works, and the mode of dealing with them, was before the Council, and I may say that I individually, as a member of that Council, and adviser of the Secretary of State, very heartily approved of the rule which was then sent out in very strict terms, that is to say, that no work was to be charged under the Extraordinary Head, except when there was a thorough and reasonable ground for supposing that it would pay as a commercial concern. But very shortly after I had reason to see the very great difficulty that there is in binding down a Government to adhere strictly to a rule of that kind. I will only mention two cases, which I may perhaps

Mr. *Onslow*—continued.

Sir *G. Campbell*, M.P., K.C.S.I.

28 March 1878.

be allowed to divulge, because I think they have already become pretty well public property; one of them was, with regard to that Western Jumna Canal, of which General Dickens has already told you a good deal. That canal, as he has already explained to you, was principally a concern which we took over from the natives, and was in a very imperfect state; it was attended with a great deal of malaria and a great deal of injury to the country. I found, when the case came before the India Council, that the strongest possible case was made out on account of the injury to the country, and to the health of the inhabitants, for the expenditure of a very large sum of money upon the remodelling of that canal, a large sum of money which would treble or quadruple the sum which has hitherto been put down as expended on that canal; but at the same time it was distinctly stated by the projectors of this new scheme, that the scheme would not add to the revenue; it was to save the country and to preserve the old revenue, but it was not calculated that it would produce any new revenue. Thereupon the question arose, whether it was a scheme which should be treated as commercially likely to pay, and I being a somewhat severe purist in these matters, was inclined to argue that it could not be put under the head Extraordinary, because it would not pay commercially. On the other hand it was very fairly argued that it would pay in this way, that it would save the country a large revenue, which would otherwise be lost; and I think it was decided that inasmuch as this was a work which was originally projected before the new rule was passed, it was not necessary to decide whether the new rule applied or not. Then another case which also shortly came up, was that in regard to the Madras Harbour. The Madras Harbour was designed by a gentleman named Parkes, an engineer, who had been very successful at Kurrachee, I suppose, but it seemed to me that he was a gentleman of a very sanguine disposition; and although Madras is notoriously one of the most impracticable coasts in the world, he considered that new engineering devices had been discovered, and he had a plan by which this Madras Harbour was to be completed for the protection of ships in the Madras roads for something over half a million of money; 56 lacs, I think it was. I have seen a good deal of harbours in a small way. I remember all my life Granton Harbour, near Edinburgh, which is a comparatively protected coast in the Firth of Forth, and which has cost a very large sum, but has never paid. I have also seen a good deal of Anstruther Harbour, a work which has been very well known in Parliament for generations, because a great deal of public money went into the sea, and I was somewhat incredulous about this great work being constructed on the Madras coast, which I know to be infinitely more difficult, with a greatly heavier sea than anything to which we are accustomed in my part of the world. I thought it was very necessary to be very cautious. The Government referred the matter to an eminent engineer in this country; but I think his opinion very much amounted to this: Mr. Parkes is a very fine fellow, and a very capital engineer, and you cannot do better than follow his advice. Then figures were produced, by which it was supposed that the shipping of Madras would pay dues which would be sufficient to recoup

Sir *G. Campbell*, M.P., K.C.S.I.

28 March 1878.

Mr. *Onslow*—continued.

the Government for this expenditure, but I did not find that the Madras Government were willing to pledge themselves upon the subject, I recorded my dissent against this work being constructed as an extraordinary work. I believe it was not constructed as an extraordinary work, but it was constructed with borrowed money, under the head of local loans under the Public Works Loan Act; I believe so, but I cannot speak quite confidently; the money was lent by the Government of India to the Government of Madras, so I understand.

Mr. *Onslow*—continued.

1115. Do you happen to know anything personally upon the subject of the success of the works?—No, nothing beyond what I have seen in the newspapers, and heard from General Dickens. I have heard that Sir Andrew Clarke's opinion is unfavourable, and I have seen that in the newspapers.

1116. I think that completes the answer to my question, what your experience has been bearing upon the subject referred to the Committee, of Works not included under the head of works whose object it is to prevent famine?—Yes.

Thursday, 4th April 1878.

MEMBERS PRESENT:

Mr. Agnew.	Mr. Fawcett.
Mr. Balfour.	Mr. Hardcastle.
Sir George Campbell.	Mr. Sampson Lloyd.
Mr. Childers.	Mr. Mulholland.
Mr. John Cross.	Mr. Onslow.
Mr. Grant Duff.	

THE RIGHT HONOURABLE HUGH C. E. CHILDERS, IN THE CHAIR.

The Right Hon. The EARL of NORTHBROOK, attending by permission of the House of Peers, Examined.

Chairman.

1117. YOU were, I think, Viceroy of India for some years?—From May 1872 to April 1876.

1118. When you first took up the office, did you pay special attention to questions of public works?—When I went out to India I found that the financial arrangements for the year 1872–73 had been very considerately settled by my predecessor, Lord Napier and Ettrick, in Council, therefore the responsibility for the Budget of that year did not rest upon me, and I had an opportunity during the whole of the year 1872, before the Budget of the following year 1873–74, to go very carefully into the general condition of the finances of India. Amongst the subjects which I had to consider, was the liabilities of the Government of India for what are called Extraordinary Public Works, namely, works which it was the policy of the Government to carry on, if necessary, by means of borrowed money. This and other financial questions were under consideration by the Government of India for almost the whole of the autumn and winter, and we came to our conclusions in the spring of 1873.

1119. At that time I think there was no Public Works Minister in the Viceroy's Council?—No.

1120. And did you take any special charge of that department, or was it assigned to one of the members of the Council?—When I came to India, I found that Lord Mayo, when he was Governor General, had taken charge of the Public Works Department, as well as of the Foreign Department, which latter department it has been the practice of Viceroys always to take under their own hands. When I arrived, I carried out the same arrangement for some time, I think for nearly a year; but I found that the detailed work of the Public Works Department was more than I could conveniently get through, and afterwards I arranged that one of the Members of Council should take it, or rather, I divided the business between two Members of Council, if I remember correctly.

Chairman—continued.

1121. At least during that year, your attention to the special question under the inquiry of this Committee was very great indeed, and you could, perhaps, give us some idea of the principle upon which you acted in the preparation of the system of forecasts which is due to that year?—The origin of the forecasts which I see have been laid before the Committee was this, that in order to come to any safe conclusion as to the finance of India, it was necessary to gauge the liabilities of India in respect to those public works that were carried on from loan funds, and technically styled "Extraordinary" Public Works; because, supposing that we had undertaken works to be provided for by borrowed money to any very large extent, it would have interfered with the finance of future years, and it would not have been safe to have remitted any taxation, because a fresh liability would come upon the revenue, which would have made it necessary to impose fresh taxation. Therefore, the main object of the forecast was to see what works, both railroad and irrigation, were intended to be executed, what the present liability upon the revenue was, and what it was likely to be for the next four or five years. We began to consider this question in the autumn of 1872. The forecast was first prepared by the officers of the Public Works Department who were charged more especially with bringing forward projects of works. Their calculations were checked by the officers of account in the Public Works Department; ultimately those calculations were examined in the Financial Department of the Government of India, and before the first forecast that was made (the forecast of the 18th of July 1873), the Finance Department had expressed their concurrence with the calculations. A resolution of the Government explained how far the Government considered that those calculations were of value. The opinion of the Government of India was expressed shortly and clearly in the Financial Resolution of the Government of India of the 28th of March 1873, in the following words, which will show the Committee what the feeling of the Government was at the

Earl of *Northbrook.*

4 April 1878.

Earl of *Northbrook.*

4 April 1878.

Chairman—continued.

time: "The schemes for public works chargeable to loan funds have been revised, and so far as reliance can be placed upon careful estimates, the completion of the system of guaranteed railways, and the construction by Government of the railway and irrigation works now sanctioned, will not entail any serious additional charge upon the annual revenues." That was our conclusion then, and the details upon which that conclusion was founded are contained in the first forecast.

1122. In the first forecast, if I am not mistaken, not only was it estimated that the three great classes of works, guaranteed railways, Government railways, and irrigation works, would not increase the charge on the public of India, and therefore would not involve any additional taxation, but actually that they would gradually decrease the charge?—So far as we could judge, they would gradually decrease annually.

1123. I think from somewhere about 2,400,000 *l.* to something under 2,000,000 *l.* a year?—That is so. The calculation will be found in the 10th paragraph of Memorandum No. 1, which was attached to the forecast of 1873; that is to say, the charge having been in 1872-73, 2,378,140 *l.*, it was supposed to be likely to be in 1877-78 something under 2,000,000 *l.*

1124. It was then the basis of the public works' policy, which you, after careful consideration, adopted, to take care that on the one side there should be a steady development of certain public works; and on the other side, that the charge on the taxpayers should not be increased, but, if possible, decreased?—Yes; in the first place, I would say that these forecasts were not intended to be, in the strict sense of the word, accounts of the cost of the public works, either of the irrigation or railway works; they were intended simply to show what the annual charge upon the revenue on account of those works was likely to be. For example, if an accurate account was to be made of the cost of any public works, either irrigation or railway, you would have, of course, to put down the interest of the money expended during the time of construction; and you would have to put down, perhaps, the charges for pensions and other things, in order to get at an accurate account of the cost of any particular work. For the purpose we had in view we did not care about that; what we did care about was, what the charge upon the annual revenues was to be. We cared about the cost of any particular work in considering whether it should or should not be constructed; but with respect to the forecast, we wanted to know what liability there would be upon the revenues of the country in carrying out the scheme of works as a whole.

1125. The forecast compared like with like in each year?—Yes.

1126. And gave as the net result upon a certain basis what was expected to be the net charge on the taxpayer?—Yes; with regard to the latter part of the question before the last, I may say that when I went out to India, I found that a very strong opinion had been expressed by Lord Mayo, and had been made public, to the effect that the recent increase of taxation, both local and Imperial, had created great discontent in the country, and that it was a matter of serious moment. The actual words were given in a Minute which Lord Mayo wrote upon the military expenditure, which has

Chairman—continued.

been laid before Parliament. Therefore it was one of my first duties to examine into that question, and I came to the conclusion that Lord Mayo was right, and that there was a feeling of uneasiness throughout the country in consequence of the recent addition to the income tax, and the imposition of certain local taxes; and the policy which I desired to carry out, and on which the Government of India were agreed at that time, was, not to undertake any liabilities with respect to public works which might occasion the necessity of increased taxation; that it would be wiser on the whole to go with great deliberation into public works, than to run the risk of discontent, which might be occasioned by putting on increased taxes.

1127. And that policy you carried out successfully, so that if I am not mistaken the surpluses during your government met the whole of the additional famine charges, and the extraordinary public works were constructed strictly on the basis laid down in 1873?—I believe that to be the fact. Of course when I said just now that "extraordinary" public works were to be carried out by means of borrowed money, I did not mean to imply that it would be in itself a good thing always to borrow to the full extent of four and a quarter millions, which was the sum which we considered desirable to expend annually upon public works; we hoped to have had a very considerable annual surplus, and to have limited the amount of money borrowed year by year to about the sum which we could have raised easily in the Indian money market, the advantage of that being that we avoided any future difficulty from a change of the relative value of the precious metals; that is to say, the loan would be made in silver, and the interst paid in silver, the standard in which the taxes of India are raised. This would have been done if it had not been for the famine of 1874. So far as I can gather the figures from the last accounts of the years for which I was responsible in India, if we exclude the charges of the Bengal famine and of the "extraordinary" public works, the surplus of income over expenditure in 1873-74, was 2,071,937; in 1874-75, 2,555,990 *l.*; in 1875-76, 2,264,675 *l.*; making a total of surplus in the three years of 6,893,602 *l.* The famine charges as given in the accounts were, for 1873-74, 3,864,673; for 1874-75, 2,237,860 *l.*; and for 1875-76, 595,779 *l.*, making a total of 6,698,312 *l.* If you compare the total of the surpluses of the three years, 1873-74, 1874-75, and 1875-76, with the famine charges, it will be seen that the total of the surpluses was 6,893,602 *l.*, and the charges were 6,498,312 *l.*, leaving a small balance of 195,290 *l.*, so that the result of those years in which the famine took place was, that the whole of the expenditure upon the Bengal famine was paid out of the surplus, notwithstanding considerable reductions in taxation which had taken place, amongst which the income tax was not reimposed. It was, however, necessary to borrow the whole of the money for carrying on the "extraordinary" public works, in accordance with the scheme laid down in the forecast of 1873.

1128. So far as you can remember, how much was spent on public works, and how much was borrowed in those years?—The whole of this statement which I am now making upon the policy of the Government of India is probably much

Chairman—continued.

much more clearly given in a part of a speech which I made in the Legislative Council on the 5th of August 1875, which has been laid before Parliament, with the exception that the figures which I have now given are later, and, therefore, more complete than those given in 1875. In the speech to which I refer the accounts for the later years not having been complete, I took the figures of four years, beginning with 1871–72, so that the figures are not precisely the same as those which I have now given. As regards the debt, I took the figures of the cash balances of the Government of India, which is the only real way to look at the whole of the transactions of the Government, and this is what I said then: "Our cash account for the four years we are examining is given in a statement which is in the hands of Members of Council. The cash balance in India and England stood, on the 1st of April 1871, at 20,174,715 *l.*, and it was estimated to stand, on the 31st March 1875, at 18,386,198 *l.*" The statement which I am now reading having been made in August 1875, the estimate of the cash balance on the 31st of March 1875 was very nearly an actual account; and, in fact, proved to be very near the actual amount. "We have spent in the four years on Public Works Extraordinary, 11,401,351 *l.*" Then I mentioned certain particulars affecting the cash balance, namely, "The balances of the Guaranteed Railway Companies have been diminished by 1,212,466 *l.*, a disbursement which is of the nature of a reduction of debt; and we have lent to native states, municipalities, &c., 1,570,231 *l.*, which we shall eventually recover, and which in the meantime has been of great benefit to those whom we have assisted. These disbursements, amounting together to 12,613,817 *l.*, have been met as follows: by diminution of cash balances, 1,738,517 *l.*; by surplus of revenue over expenditure, 805,860 *l.*; by excess of receipts over disbursements on the sundry accounts which are embraced in our cash transactions, 2,103,007 *l.*; and by net increase of debt, 9,536,664 *l.*" That is the figure that I was coming to. The net increase of debt in those four years was 9,536,664 *l.*, "an increase which is considerably less than the sum spent upon Public Works Extraordinary," the sum spent upon Public Works Extraordinary in those years having been stated in the beginning of my remarks to have been 11,401,351 *l.*, so that in those years there was a considerable amount of money spent upon Public Works Extraordinary, which was provided either by reduction of cash balances, that is to say from the surplus of former years, or from the surplus of the years under consideration; I do not think that the amount will come out quite so well as for the succeeding years, because there were some further charges for the Bengal famine; but speaking generally, the whole amount of the money that was borrowed during the four years I was in India was applied, not to paying the famine charges, but to carrying on the Extraordinary Public Works.

1129. I suppose that the 9,000,000 *l.* which was directly borrowed ought to be added to the 2,000,000 *l.* which was derived from the operations in connection with the fund which is really borrowed money?—We excluded that so far as we possibly could from our accounts.

1130. Practically, you had the advantage of that 2,000,000 *l.*?—I never could see that we got any real advantage from that transaction at all; but it is a very complicated matter of account, and what I endeavoured to do respecting that particular item of account was to exclude it practically from the revenue and expenditure accounts, so that it should not be supposed that there was any real sum which we could dispose of for any practical purpose, for there was not.

1131. If we brought the principle of the calculation down to the period which you gave us, first beginning with 1873–74, and going on to the end of your government, practically it may be taken in this way, that had it not been for the famine, you would have been able to obtain about half the amount which was spent upon public works from the annual surplus, and that, as a matter of fact, the annual surpluses were exhausted by the famine charges, and you therefore virtually had to borrow the whole amount; but that the principle upon which those works were constructed was that they were to be reproductive, so that in the end no increase of charges was occasioned; that was your public works policy, was it not?—That is exactly so. It is as well, if possible, to express the opinion which I formed when in India by what was said at the time, rather than anything which I can say now, and these are the words used by me on the 5th of August 1875, which will supply an answer to that question: "We," that is, the Government of India, "considered that however advantageous the extension of railroads or irrigation works might be, it would not be right to carry them on at such a rate as would require the imposition of fresh taxes; and the rate of expenditure has therefore been based upon calculations showing that any additional interest for which we may be liable on account of money borrowed for the purpose of constructing railroads and canals, will be met from increased receipts derived from works which have been, or will from time to time be, completed and brought into operation."

1132. So far as experience can enable you to give an answer, that has been the case?—I think the result shows that, with the certain differences which will almost invariably occur when dealing with Public Works, as, for example, an alteration in the gauge of a railroad, and fresh estimates for this work or the other, on the whole, the comparison of the 1875 forecast with the 1873 forecast was very satisfactory to the Government of India. It showed that the officers of the Public Works Department had taken very great pains to make accurate calculations, and that their calculations on the whole were justified by the results.

1133. In making the calculation, did you allow for the interest on works during construction?—Certainly not, the interest on works during construction was charged to revenue. We did not put any charge for interest upon money laid out on works during their construction to the capital account of the works; it was invariably believed to be a sound principle in regard to public works constructed by the State by means of money raised by loan, to charge no interest during the construction to capital account.

1134. So that the forecast and the accounts resulting from it were unfavourable to the Government in that respect; that instead of, as is very often

Earl of *Northbrook.*

4 April 1878.

Chairman—continued.

often the case with public companies, the interest on works in construction being accumulated, and being added to capital, it was charged in the calculation that was made of the profit and loss of the works in the aggregate?—The forecast was in no way intended as a commercial account; I think it would have been disastrous to the Government of India if they had treated the expenditure upon public works as if they had been a commercial company, and charged interest to the capital account; that is to say, if they had gone on borrowing money to pay the interest of the money which had been already borrowed for public works. There would have been no check whatever upon the expenditure.

1135. In that respect, I think the Government accounts have been framed in the most unfavourable manner possible to the Government?—That is so; it was the endeavour and desire of the officers concerned to put any doubtful point against the Government, rather than for it. If it was to be taken as an argument whether any particular work did or did not pay, whether it was a productive work in the sense of paying a certain rate of interest on the money, then the calculation was favourable to the work, but if it was a question of the solvency of the finances of the country, then our mode of calculation was unfavourable to the Government; we cared more about the general financial aspect of all those works together than about the fact whether any particular work paid 4 or 5 per cent.

1136. In paragraph 10 of the forecast, in the Memorandum of July 1873, where the net annual charge is given, you charge the full interest during the construction, although the works were producing nothing?—Certainly.

1137. You have not, however, included in the annual charge any provision for a sinking fund?—No.

1138. Would you have any objection to tell the Committee why the Government of India deliberately decided not to provide any sinking fund for works of this kind?—It never was brought before us that I recollect. It seems to me that to establish a sinking fund, at a time when you were deliberately borrowing year by year, would be of no value financially; but I know it is a matter on which there is a great difference of opinion.

1139. I do not mean so much the formation of the sinking fund itself, or the other economic fallacies connected with the sinking fund, but whether in the calculation of the net profit you made any provision for the possibility of the works being entirely obsolete after a certan number of years?—No, we did not; and the reason of that is, that all repairs, maintenance, and so on, were charged to revenue; they were not charged to the capital account.

1140. Even though there might possibly, on strictly commercial principles in some cases, have been improvements or additions, and therefore chargeable to capital account?—Yes; it certainly would have been my own view, as I have said, to exaggerate the charge against revenue, and to diminish the charge against capital.

1141. Is that laid down in any paper of that day?—I am not aware; in fact, the only works as to which it might have been considered desirable to establish such a sinking fund had only just been constructed, and therefore that question had not seriously arisen.

Chairman—continued.

1142. Of course you are aware, that although it is not the custom with English railways, or works of that class, to establish a sinking fund, it is the policy of almost every foreign state to provide for the distant time when the railway system may become out of date altogether?—I do not know that.

1143. I will not ask you any questions in detail, either about the guaranteed railways, or the State railways, except this: have you read General Dickens' evidence?—Yes.

1144. May I ask whether you, generally speaking, concur with General Dickens, whether you look upon his evidence as accurate and satisfactory?—I read the evidence through carefully, and it seems to me that the answers given by General Dickens to the questions put to him were very full, and to the best of my recollection perfectly accurate with respect to all the matters with which he was connected when he was in India; General Dickens is an officer of very high reputation; he was a long time at the head of the Public Works Department, and he was particularly distinguished for the accuracy of his figures, and the reliability of any statements that he made.

1145. But so far as you are acquainted with them as to the detail of the works, and generally as to irrigation policy, General Dickens has given us the views of the Government of India accurately?—Yes, certainly; I have no recollection of anything in his examination to which I would take exception in the description of the works, and of the policy of the Government.

1146. With respect to irrigation, General Dickens stated this, I think, that an officer was appointed who was called the Inspector General of Irrigation Works in India; was that appointment made during your government?—No; the Public Works Department in India had been organised very shortly before I went to India, by Lord Mayo; the whole system had been recently altered. My feeling is against any sudden changes or alterations in carrying on public business, and I left the system exactly as it was organised by Lord Mayo during the whole time I was in India.

1147. Who was at the head of the Irrigation Department?—At first Colonel, now Major General Rundall, of the Madras Engineers, and afterwards Colonel, now Major General Crofton.

1148. In General Rundall's time was there any report furnished to you of the general policy of irrigation by him?—He made several reports on different works which he visited himself, and which were very interesting; but after the Bengal famine in 1874, I requested General Rundall to draw up a Memorandum, giving a sketch of the state of irrigation over the whole of India; showing how far irrigation works had provided security from the failure of the crops and drought in different parts of India; what remained to be done, and in what kind of order the works should be taken up. He sent me that Memorandum, and I happen to have a copy of it, which, if it is interesting to the Committee, I can put in. I do not wish to be considered as agreeing with everything that is in General Rundall's Memorandum. There may

Chairman—continued.

may be recommendations in it which I should not have agreed with, and which I should have thought required further inquiry before they were adopted. At the same time they are the opinions of an officer who knew more about irrigation, probably, than any other man in India; and, therefore, so far they are very valuable.

1149. That paper is a report to you upon the whole of the Irrigation Works of India, is it not?—It is a general sketch of how far irrigation had been carried out, and what was wanting to be done.

1150. Though you do not, as you say, pledge yourself to adhere to it in full detail, yet it expresses on the whole the history of recent irrigation works in India up to March 1874?—Yes, it does.

1151. Would you have any objection to making it part of your evidence?—There is no reason why it should not be put before the Committee (*the same was delivered in*).

1152. The Committee understand, however, that the proposals which General Rundall makes to that paper do not at all bind yourself?—Yes. I should say this, as regards the account which General Rundall gives of irrigation works which were in existence at the time, I believe that the account is accurate, because there was no man who knew more about them. With respect to the proposals for further irrigation works made by General Rundall in this memorandum, they are simply his own opinion, and his own view of what was required in India; they do not convey either the opinion of the Public Works Department of the Government of India, or my own with regard to those works; it is probable that the opinion of the Government of India was expressed upon the Memorandum at the time, and if so, the paper could be obtained at the India Office. I have no document of the kind among my papers.

1153. Can you tell the Committee whether the policy of the constructing of particular works was much discussed in your time, and whether any works which had been strongly recommended were either postponed or negatived by the Government of India?—We had to consider, in making out the first forecast, what works were contemplated, and there were several despatches sent to the Secretary of State, giving our opinion upon certain works. They are mentioned in a letter of the 9th of September 1873 to the Secretary of State, which has been laid before the Committee, and which enclosed the first forecast; in the fourth paragraph of that letter we said, "We have taken steps to remove from the list of irrigation works in contemplation, several projects of which we doubt either the need for proceeding with them at once, or the prospect of adequate return. In other cases we have, without stopping the works, ordered that they shall be charged to the ordinary revenues, and shall not be classed as "extraordinary." In the margin to that paragraph different projects are mentioned; one was the permanent irrigation in Sindh, which we determined not to go on with, and another was the Sardah Canal, which was a plan for the irrigation of Oudh, which we determined not to go on with. The opinion of the Government upon those two proposals, which were matters of importance, were given in the Irrigation Despatch, No. 8, of the 13th of January 1873, about Sindh; and in the Irrigation Despatch, No. 9, of the 15th of January 1873, about the Sardah Canal. If the Committee desire to see those despatches, they could be furnished by the India Office.

Chairman—continued.

Earl of *Northbrook*.

4 April 1878.

1154. You read in the latter part of General Dickens' evidence, the view entertained by the Government of India at the time when he left, which I think was shortly after you ceased to be Viceroy, as to the annual sum to be expended both in irrigation and public works. General Dickens, I think, said that in a prospective estimate so much was to be set aside, so much was to be provided every year, on an average, for public works generally, so much for railways, and so much for irrigation; is it your opinion that it is a sound policy to devote as nearly as possible an equal annual amount to reproductive works?—That was our desire, but we found it necessary to reduce the sum even while I was in India. We began with an expenditure to the extent of four and a quarter millions upon those works. That determination was come to at a time when there was no Bengal famine, and when the revenues were in what I should consider a very flourishing condition, and we went on at the same rate the next year. In the third year, 1875-76, as shown in the 1875 forecast, we determined to reduce that annual rate of expenditure to four millions; but in the year 1876-77, in the last Budget for which I was responsible in India, Sir William Mure, who was the Financial Member of Council, expressed the opinion of the Government of India that the fall in the value of silver at that time was so serious, and the future prospects of the silver market were so doubtful, that it was necessary for the Government to place a check upon all expenditure, in order to be prepared for a serious financial crisis; one of the measures that we took to be prepared for the difficult time which was quite possible to arrive was, that we reduced the expenditure upon public works to three and three-quarter millions, and I think the Committee will see from Sir William Mure's statement, if it has been put in before the Committee, that he expresses the opinion of the Government that, if necessary, still further reductions might have to be made, in order to avoid the necessity of raising fresh taxes for the purpose of meeting the additional cost of making the remittances to England.

1155. At that time you contemplated not to borrow the whole amount which was required to be spent in reproductive works, but practically to apply to them the entire surplus from year to year on the ordinary account; we have it now that the view of the Government of India, and the form of account would follow that view, is, that the whole of what is required for reproductive public works should be shown as borrowed money, the annual surpluses, if any, going to reduce the loans raised for general purposes; does the adoption of that policy at all affect your view, that in going on to recent years, when the fall in silver has affected the finances of India so heavily, the amount applied to reproductive works should be diminished?—It seems to me that the change is more a change of account than a change of policy. There is no difference in reality between applying the surplus to carrying on reproductive works, and applying it in the reduction

Earl of *Northbrook.*

4 April 1878.

Chairman—continued.

of debt, and at the same time creating an equal amount of fresh debt, both transactions being simply matters of account. In reality the surplus is applied to reproductive works. So far as I understand the policy, there is no change of policy, but simply a change in the system of account.

1156. That is to say, the necessity of making such sudden and heavy remittances to England in consequence of the fall in silver should be a considerable element in deciding how much should be borrowed, on the other hand, for public works?—I apprehend the question is whether, supposing that the surpluses, instead of being so large as they have been, say, about two millions, are reduced for the future, the same rate of expenditure in Extraordinary Public Works would be desirable. I think that is a very serious question. I think myself that the rate of expenditure of four millions a year would be too high, if we have to borrow four millions every year for public works. My own feeling was that we ought not to borrow more than two and a-half millions a year for public works.

1157. You mean such times as we have gone through lately?—Yes, that is my opinion. I should hesitate, myself, in becoming responsible for a system of public works which required the Government of India to be obliged to borrow as much as four millions a year.

1158. But that when times have improved, and either the famine charges were low, or silver rose, and the amount in that way to be remitted home has been diminished, then you would go back to the larger estimate of annual borrowing for public works?—Yes. I should explain that better by saying that I should like very much to spend four millions, or four and a quarter millions, but I should not like to spend so much out of borrowed money. I should not like to add to the debt to that extent every year.

1159. Although the addition to the debt, on the principle that you laid down, would not increase the taxation, because the works would be reproductive?—Although it would not increase the taxation; one of my reasons is, that it would be difficult to raise so much money as four millions in India; when I was in India I do not think you could have done so.

1160. And you would be obliged to have recourse to the home market?—I think, considering the great fall in the value of silver as compared with gold, it would be dangerous to increase the loans in sterling.

Mr. *Balfour.*

1161. Then your chief objection to borrowing four millions for India would not be the difficulty about the silver?—My objection is that I have not got the surplus.

1162. Supposing you could have borrowed it in India, would you have objected to doing so?—I think it is rather more than I should have liked to have borrowed in a year, even in India.

Chairman.

1163. Even although the act of borrowing in England would ease the exchange to a certain extent, and diminish the silver difficulty?—The effect upon the exchange is merely temporary, whereas every loan raised in sterling in England adds to the permanent annual liability of making the remittances.

Chairman—continued.

1164. Therefore you do not agree with those who have rather put forward the idea that you would diminish the silver difficulty by adding very much to the borrowing in England, and who have promoted public works in India with that view?—Certainly not, except for the moment.

1165. That you look upon as an economic heresy?—I look upon it as a mistake.

1166. Therefore, when you said that you looked upon General Dickens' evidence as extremely valuable and sound, you would modify it to that extent, that in times of financial pressure you would not be prepared to advocate the same amount of money being borrowed for public works that you would in times of financial ease?—I do not recollect that part of General Dickens' evidence. The opinion which I gave upon his evidence was as regards facts, and was not intended to express my concurrence in everything he may have said upon matters of opinion.

1167. General Dickens stated that it was the policy of the Government of India to borrow about an equal amount from year to year; you would qualify that by the caution of borrowing less in times of financial difficulty?—I should have liked to have borrowed about two and a-half millions a year for carrying on the public works, because I think that is about the amount that you could get easily in the Indian money market. Therefore, with that qualification, I should agree that the amount to be borrowed should be the same year by year.

1168. But you would supplement that provision by the annual surplus, so that when there was no annual surplus, the amount to be applied to Public Works would be so much less?—Yes; with regard to borrowing, I should like to say that the principle in borrowing money is to borrow it in the cheapest market, and therefore, apparently, it would usually be better to borrow money for Indian purposes in England than in India; the only reason I would borrow in India is, that the liability would then be incurred in silver, and not in gold. The taxes of India are raised in silver, and not in gold; and to incur liabilities in silver seems to me to be the only safe way of borrowing now that there is so much doubt with respect to the future relative value of the two metals.

1169. You do not feel yet that we are by any means out of the silver difficulty; it may occur possibly again to even a greater extent?—I have had no particular means lately of forming an opinion upon that question.

1170. Still, until that question was finally solved, you would prudently not borrow more than could be helped in the English markets?—I think that anyone who is responsible for the finances of India must look with great anxiety upon the condition of the silver market, and naturally would be cautious about incurring liabilities in gold.

Mr. *Hardcastle.*

1171. Will you state what would be the difference in the rate of interest on money that would be borrowed in the Indian markets compared with England, or whether it could be got at about the same rate?—These were the loans that were

Mr. *Hardcastle*—continued.

were raised in India and in England: "In 1874, five millions sterling were borrowed in England at 101 *l.* 7 *s.* 11¼ *d.* for 100 *l.* stock." "Two and a-half crore of rupees (equivalent to two and a-half millions) "were borrowed in India at *Rs.* 102. 12. 2. for 100 rupees stock"; 4 per cent. was the rate of interest for both loans. So that we got our money cheaper in India than we did in England in 1874.

Chairman.

1172. That was just before the silver difficulty commenced, was it not?—Yes; but you will remember that this is a mere question of credit, because the interest upon the rupee loan was paid in silver, and the interest upon the sterling loan was paid in gold. "In 1875, two and a-half crore of rupees" (two and a-half millions in round numbers) "were borrowed in India, at *Rs.* 102. 3. 8. for 100 rupees stock," which was still better than 1874; our credit was very good during these two years.

Mr. *Hardcastle.*

1173. I understood you to say, that England was a cheaper market to borrow in, but according to that, India was the cheaper market?—It was at that time, and for that amount, about two and a-half millions; but if we had asked for a larger sum, we should not have got it at the same rate, because there is not the same amount of capital in India that there is in England.

Sir *George Campbell.*

1174. I think you stated, that in the course of the three years of your Viceroyalty, about eleven and a-half million was charged to Extraordinary Public Works?—No, not in those three years; that was the amount spent upon Extraordinary Public Works in the four years beginning with 1871, and ending with 1874-75.

1175. As to the amount which was charged to the Public Works Extraordinary during your Viceroyalty, can you confidently say that the whole of that amount was expended upon works which you believe are likely to be reproductive on a fair calculation?—If by the word "reproductive" is meant that they are likely to increase the wealth of the country, I should say certainly yes; if it is meant that they will be reproductive in the sense of paying a certain amount of per-centage upon the cost of each work, I should be very sorry to commit myself to any such assertion.

1176. As a commercial undertaking, you are not prepared to say that all those works will be reproductive?—No; there are some that certainly will not be.

1177. Might I ask your Lordship to name any particular works which you remember, and which you think are not likely to be reproductive in a commercial sense?—I think the Indus Valley line of railway is not likely to pay much interest upon the money spent upon it.

1178. Is there any other work of that kind?—I daresay there may be others.

1179. You are aware that in 1874 the Secretary of State laid down a strict rule, that no work should be charged as extraordinary which is not what I have called commercially reproductive; what I want to ask is, did you, as head of the Government, accept and act upon that rule strictly?—The Secretary of State explained to me that the remarks in that despatch were not intended to apply to any works which had already been commenced, but only to future works; and it was stated, I think, officially by the Government of India in a letter in reply, that we understood the rule laid down by the Secretary of State to apply only to future works. The honourable Member is aware that all works of importance, such as the commencement of a new line of railroad, or any great irrigation work, are referred by the Government of India, with full calculations, estimates, and so on, to the Secretary of State in Council, in England, for approval; and therefore as each work comes up, the Secretary of State in Council has an opportunity of either approving of the construction of the work, and allowing it to be charged to "Extraordinary," or not.

Sir *George Campbell*—continued.

1180. Was that explanation, that the order was not to apply to works which had been commenced, ever stated officially by the Secretary of State?—I believe so; I cannot say positively whether it was so, but I know as a fact that that was the intention of the despatch.

1181. As a matter of fact, are we to understand that up to the time of the receipt of this Despatch of 1874, and as regards all works which were under construction at the time, the rule was not followed, that the expenditure upon Public Works Extraordinary should be confined to works which were likely to be commercially remunerative?—I think it was intended to be followed as far as possible. The fact is, that when a work is proposed, and is reported upon, it is almost always the case that it is supposed by the engineer who puts it forward to be a remunerative work, and therefore if you were to go upon any such principle, you would allow any work to be constructed.

1182. Does not it appear to you that there would be very great danger in applying that relaxation of the rule in the future?—I should be very sorry to see the expenditure of the Government of India upon public works governed by that rule only, because it has often happened, in constructing a work, that the original estimate is found to be insufficient, and such calculations would be an unsafe guide by which to govern the public works expenditure; that is my own opinion and that of the officers whom I consulted, and upon whose opinion I relied. I myself very much prefer basing the expenditure upon the principle laid down in the forecasts, namely, that no more than a certain annual charge should be placed upon the revenues; I think it is a very much safer guide for expenditure on public works to be met by loan than any estimate of whether the works are likely to pay or not.

1183. Would you maintain that rule as a sort of perpetual rule, that those two millions of deficit should be maintained, but should not be exceeded?—Certainly they should not be exceeded unless the country became very much richer. Supposing it was found that the revenues of India were so prosperous that they could stand an expenditure of three millions a year upon public works, I think that the expenditure might be increased, but I am afraid that India does not look so prosperous now as to give an idea that such a thing could be done.

Earl of *Northbrook.*

4 April 1878.

Sir *George Campbell*—continued.

1184. Practically, has not the result of the rule which you have laid down been, that all the extraordinary profit which of late years has been realised from the Grand Trunk lines of railway which were designed in Lord Dalhousie's time, has been used up, as it were, in order to make up for the deficiencies which have occurred, and are likely to occur, in the more modern works?—Not exactly so. No doubt the revenue upon the guaranteed railroads is coming in very much better, and now enables the Government to go on with other works. It would be more correct to say that it enables capital to be expended in extending railroads to other places. Then as those railroads are finished, and returns come in from them in their turn, you will be able to go on making fresh railroads.

1185. You have laid down as a sort of general rule, that public works may be undertaken provided that the loss does not exceed a certain sum per annum, but you would be very sorry to restrict the particular works which would be charged to Public Works Extraordinary, to those works which were most likely to be commercially remunerative; can you suggest any rule for dealing with particular works other than the commercial rule by which the State should be saved from the danger that enthusiastic engineers, who almost always show that their works will pay, might lead the country into very unremunerative works, which might turn out to be in no degree expedient or justifiable?—I do not mean to imply that I wish works to be undertaken that would not be commercially remunerative. I should like to see every new work which is to be constructed very carefully examined, and, excepting in very rare cases, that it should not be undertaken unless it would pay a fair commercial return. I would not go to the extreme of laying down a hard-and-fast line that it must actually repay so much interest upon the capital employed in its construction, but still it would come very near that. There may be cases in which it would be desirable to undertake works that would not bring in such a return, but those cases should be exceedingly rare.

1186. Would you leave it to the Government of India for the time being to decide what are the exceptional cases in which the rule might be departed from?—I think so, subject to the approval of the Secretary of State in Council, according to the principles upon which the Government of India is conducted.

1187. Has it not been your experience that on many financial subjects, most especially upon the subject of public works, public opinion is apt, if I may so express it, to oscillate between extremes; that there are times when the tide of opinion in favour of public works rises very high, and is there not considerable danger that if no hard-and-fast line regarding commercial remuneration is laid down, you might have a time when the Government might be carried away by the high tide of public opinion, and you might have a Viceroy or a Secretary of State who took a strong opinion in favour of public works, and who might launch out into great public works that were really unremunerative, under the plea of exceptional advantages and the general benefit to the country?—Under the state of things contemplated by the honourable Member, which I hope will not occur, the Government of India would simply, in conjunction with the Secretary of State in Council, alter the rule in conformity with their views.

Sir *George Campbell*—continued.

Mr. *Agnew.*

1188. You spoke of the Indus Valley Railway as not paying, and of other railways in India which do not pay commercially, but, probably, by enabling a smaller army to do the work which a larger army without railroads could not do, they tend very greatly to economy in the expense of India; is not that the case?—I do not think that the army employed in India could be reduced in consequence of the completion of the Indus Valley Railway; but the railway will be advantageous for commercial purposes. It will probably increase the trade of the Punjaub to Kurrachee and the exports of that province very greatly.

1189. There has been another railway carried from Lahore in the direction of Peshawur, which is not likely to pay commercially; that would be an advantageous military line, would it not?—A most important military line.

1190. Although the army might not be reduced, owing to the extending of railways, perhaps the extending of railways may prevent the army being increased?—That line of which you have spoken is a most important military work, and also of some value commercially.

1191. Therefore economy may be effected, may it not, in other branches by the construction of some railways, although the commercial results may not actually pay the interest of the expenses?—Certainly, in the transport of stores and other things, there will be a great saving.

Mr. *Balfour.*

1192. I understand that the interest of the whole fund expended on public works, whether they are finished or unfinished or in course of construction, is charged to the revenue produced by the public works as a whole?—It is charged to the general revenues of India as a portion of the ordinary charges of the year.

1193. But when you consider what the Public Works return, of course you must separate the return of the Public Works from the rest of the revenues of India; and as a matter of fact, in this forecast you separate the returns obtained from the Public Works from the general products of taxation?—In calculating the receipts from works, the calculation would be made in this way: how much is the Government likely to get in a particular year from certain irrigation works, whether from water-rate or from increased land revenue. With regard to railroads it would be calculated in this way: how much in a particular year are the traffic receipts of a certain railroad likely to be, after payment of expenses, and you would put down the probable receipts from both classes of works for the year.

1194. We have been informed on this Committee that the public works as a whole, return, I think, 5½ per cent., and that was estimated, was it not, in this way, that if the public works, finished and unfinished, were massed together, and the returns from them were also taken together, a comparison of the two gave the per-centage?—That would be a calculation of an entirely different description from the forecasts, which were made for

Mr. *Balfour*—continued.

for a different purpose. There have been most careful accounts made out to show what the actual result of the different public works has been in respect to their whole cost and the receipts derived from them, showing whether they pay or whether they do not pay; but that is a different calculation altogether from the forecast.

1195. Supposing a work is in course of construction, it clearly pays no interest, you spend a certain amount of money annually on it, and you can get get nothing for it; do you add the interest at 4 per cent. on that money to the capital account, or do you not, when you estimate the general return from public works?—I could not answer that question unless I saw the particular return to which the honourable Member alludes; there are many returns made that would rightly charge the interest upon the capital expended on the construction, but unless I saw the particular return, I could not answer the question; I do not know how the particular return was made.

1196. The particular difficulty which the Government of India appear to have had in their forecasts, arise from the unchecked enthusiasm of the engineers, and it would appear to be altogether impossible, or at least difficult, to trust altogether the estimate of any engineer in India?—I did not wish, in anything I have said, to imply that Indian engineers are different from any other engineers; I believe that the engineers in India are equal to any engineers in any part of the world, that their estimates are as accurate as the estimates of any other engineers, however distinguished, in any country; but there are so many difficulties with regard to irrigation works that it is exceedingly difficult beforehand to feel secure that the original estimate for a work will not be exceeded.

1197. Of course, there must be a certain number of errors in all cases of that kind, but the errors in this case appear to be almost always in one direction; they appear almost always to think that the works will pay; they never appear to think that a work will pay less than it ultimately does; the errors, in fact, are all on one side?—I do not exactly know to what works the honourable Member alludes, and without knowing that, I could not give an answer to his question.

1198. Are there any works which have paid more than the engineer who estimated for them thought they would?—I believe that some works of irrigation in the Madras Presidency, the anicuts across the Madras rivers have realised the anticipations of Sir Arthur Cotton and the other engineers who constructed the works.

1199. Have they much more than realised them?—I could not say much more, but I believe they are realising the expectations that were entertained.

1200. You think that there is no possible way of checking by professional advice this particular tendency to sanguine estimates?—I should say, that there was no particular tendency on the part of engineers in India to sanguine estimates. I think that the estimates of all engineers require to be carefully checked; and the Government of India have taken the greatest possible pains to check the estimates. There is, for example, in the Public Works Department in India, a branch of that department, consisting of engineers whose

Mr. *Balfour*—continued.

duty it is to check the estimates of the executive engineers, and who have done exceedingly valuable service in checking those estimates; and the Government of India have always endeavoured to impress upon those who are trusted to make the estimates for works to be very careful in their estimates of cost, as well as in their calculations of the probable returns from projected works. I do not wish to imply any blame upon any of the engineer officers in India.

1201. There is no further check which occurs to you which could be placed upon the estimates of engineers which is not already placed upon them by the system which obtains in India?—I think that the Government before they undertake an important work of irrigation, or a railway, cannot be too careful to have the work in every particular very carefully considered, and not to be in too great a hurry to embark in large works. I do not know anything else that I could suggest. It is always desirable to take, in respect of irrigation works, the opinions of the officers who are employed in the collection of the revenue, and also, when possible, the opinions of the native landed proprietors should be taken with great pains, and most carefully considered before any great irrigation work is begun.

1202. With a view, I suppose, of knowing whether the natives will take the water readily when it is furnished?—With that view, and to hear what their opinion is as to the effect of the water upon the land, because sometimes the effect has not been beneficial.

Mr. *Grant Duff.*

1203. Are you satisfied thus far with the experiment of State railways?—Yes; everything that I know about State railways is entirely favourable. They have been, I believe, well constructed and well worked by able officers, both civil engineers and military engineers.

1204. You would not think of reversing the policy of a few years ago, and returning to the old guaranteed system?—No; I do not see any necessity to return to that system at present.

1205. The Public Works Department in India, as you are aware, has been very often the subject of criticism, and sometimes of very severe criticism, but I think I gathered from what you said a little while ago, that your experience of it was highly favourable?—In speaking of a large service like the Public Works service in India, and giving a general opinion upon such a service, there is no doubt that certain failures occur to one's mind which have taken place with respect to certain works which were not creditable to the officers concerned; but, looking at the service as a whole, and looking at the very great works which have been carried out by that service, I think that the service will bear favourable comparison with any service of the kind in the world, whether civil or military.

1206. In short, the Government of India, in its dealings with public works, had to learn its experience slowly, and had to train officers for the purpose?—Yes.

1207. Looking back to the whole of its history in that behalf, you would say that it has, considering the difficulties, been extremely well served by its officers?—Certainly.

1208. And you would say, I suppose, that

Earl of *Northbrook.*

4 April 1878.

Mr. *Grant Duff*—continued.

those officers, with a very few more years' increase in their experience, will become more and more fit for the purpose for which they were called into operation?—The education of engineer officers, has been, within our recollection, very much improved, and now I believe it to be as nearly perfect as it can be.

1209. Then you look favourably upon the change which was introduced under the administration of the Duke of Argyle, when he established Cooper's Hill College?—I never had to give an opinion upon that question, nor have I considered it sufficiently to be able fairly to give an opinion upon it.

1210. I understand that you speak highly of the modern engineers who come from that institution?—I meant my observation to apply chiefly to the education of military engineers.

1211. I suppose the fact is, that the engineers who came from Cooper's Hill College were so much in the lower parts of the service that you were not brought in direct relations with any of them?—They were too young for me to have much to say to them, but everything that I heard of those men was entirely favourable.

1212. We are directed to consider Indian public works with especial reference to their bearing upon the prevention of famine; and I wish to ask what your Lordship's experience has led you to consider to be the best means of warding off, or mitigating famine by public works?—I can give no other answer to that question than that the Government should continue the gradual extension, both of the railways and means of communication, and of irrigation works throughout India; and direct especial attention to the parts of India which are more liable to drought than others; and in my own opinion, as regards irrigation works, they should pay particular attention to such minor works as could be introduced, and kept up in many parts of India with great advantage.

1213. In short, you think that the Government of India should continue to act in these matters pretty much as it is doing now?—Yes, that is my opinion; and I should distinctly give my opinion against any such extension of railroads or irrigation works, in India, for the purpose of preventing famine, as would occasion a charge upon the Indian revenues which would necessitate an increase of taxation.

1214. Then would you think it highly unwise to do as we were lately recommended to do, that is to say, to raise immediately a very large sum of money by loan, and to spend it all as quickly as possible upon a gigantic system of irrigation in India?—I should be entirely against any such immediate expenditure of money; I think it would be most likely to result in unwise and extravagant expenditure, because works carried on to that extent in a hurry, would necessarily be hastily chosen and imperfectly supervised. The proposal is also open to a more important objection, in my opinion, namely, that you would have to put on increased taxes upon the people of India, a measure which I consider to be exceedingly serious, and much to be deprecated.

Mr. *Mulholland.*

1215. When you say that you would not advocate the expenditure of public money upon railways or irrigation works, which might add to

Mr. *Mulholland*—continued.

taxation, you mean, I suppose, that you would not recommend the expenditure, unless it was to be directly reproductive?—No, I would not advocate the expenditure, even if it were likely ultimately to be reproductive, because it could not be immediately reproductive, and therefore you must in any case at first, impose fresh taxes, in order to pay the interest of the money borrowed.

1216. You do not conceive that the ultimate advantage would be so great as to be more than an equivalent for some short preliminary period when the work was not productive?—That might be so, but it would be impossible to persuade the people of India that it was so.

Mr. *John Cross.*

1217. With regard to the public works policy of which you spoke, you said, I think, that the taxation for public works was not to increase between 1872 and 1877, but rather, according to the forecast, they decreased considerably between 1873 and 1878?—Certain taxes were taken off between the years 1873 and 1875.

1218. I mean that there would be a decrease in the loss of interest, or want of interest, between those periods?—Yes, there was a little.

1219. Did that anticipated decrease take place to the full extent?—Yes, and more; because the traffic receipts from the guaranteed railways were largely increased by the carriage of grain during the Bengal famine.

1220. That was the only reason, was it, why the expenditure was less than was anticipated?—I believe that the forecast made by the Public Works Department in 1873 was very carefully drawn up in that, as in all other careful estimates, the balance was put the wrong way, and the actual figures came out better than the estimate, and they would have come out better, even if we had not had the advantage of this accidental increase of traffic.

1221. I think you said also that the interest was never added to the capital account of public works?—The interest has never been charged against capital in the accounts, and every farthing of interest paid upon loans raised for public works has been charged to the ordinary expenditure of each year.

1222. If interest were charged on expenditure which has been already incurred to the time of completion, would not the cost of the public works be very much greater than the ostensible cost is now?—Certainly; I quite agree with that. In an account prepared for the purpose of showing what each work cost, it would of course be necessary to put down the interest of capital employed during construction, but I thought that the honourable Member meant whether as a matter of finance the interest was charged to debt, or to annual expenditure.

1223. My object would be to get to know rather what the ultimate return of the work was?—I believe figures could be produced at the India Office which would give the Committee such calculations as have been made, showing the results in the case of each particular work.

1224. In many cases, the works instead of paying 5, or 5½ per cent., or 6 per cent., would only, if the total cost including interest were reckoned against them, pay 4 per cent., or even less?—I cannot answer that question without having

Mr. *John Cross*—continued.

having the precise account before me which I could examine. If the honourable Member would give me any account and ask, Does this account give a fair account of the total cost of the work, and so on, I should be very glad to endeavour to answer the question, but I have no such account before me; accounts of the kind have been made and examined very carefully in India.

Mr. *Sampson Lloyd.*

1225. May I ask you, bearing in mind the last question of the honourable Member for Bolton, and the answer to it, whether you have any doubt that the result of this expenditure which has been alluded to for railway and irrigation works, even if the interest were added to it, as the honourable Member for Bolton proposed, speaking generally, has been beneficial in a military if not in a commercial point of view?—I should say that I entertain no doubt as to the great value of the works; I am not prepared to say that every single work that has been carried out in India has been perfectly sound and wise, but, speaking generally, both railroad and irrigation works have been of the greatest advantage, both commercially and otherwise, to the people of India.

1226. I gather from one of your former answers, that you considered the amount spent on public works extra during your administration was, if not directly, yet indirectly, productive; may I ask what are the precise benefits arising out of irrigation works in particular; are they confined to the increase from dry revenue to wet revenue, and to water rent; or in what other way can you point out that they are productive?—The other way would be that they would guarantee the country against the effects of a drought. For example, take the North Western Provinces at the present time, and certain parts of the Punjab, you may say that the irrigation works which have been carried out in those two provinces have made the whole of that part of India, which is one of the most important parts of India, secure against famine.

1227. In fact, the prevention of famine and the increase from dry revenue to wet revenue, and the water rent, are the total benefits which you would expect from irrigation works?—There would be also the value of the water communication where a canal is made navigable.

Mr. *Onslow.*

1228. Did your Lordship when you were in India ever consider the propriety of having a compulsory water rate where you have irrigation canals?—It was never brought before me officially while I was Viceroy. The matter had been discussed during the three or four years before I came to India, and I think the decision of the Secretary of State, the Duke of Argyll, against a compulsory rate, was received just before or just after I came to India, and the question was not raised again during the time of my stay in India.

1229. I daresay you are aware that it has been said, that if the Government of India improved the land, which no doubt they would do, by irrigation canals, they would be in an analogous position to a landlord in this country who improved his land by drainage and by doing

Mr. *Onslow*—continued.

certain other works, and therefore as a landlord in England would enhance his rent, so the Government of India by the improvements which they made, might be supposed to be in the position of the landlord; would you look upon it that you could levy a compulsory water rate upon the people, viewing it in that light?—My opinion, having read the papers connected with this question, would be on the whole, against a compulsory rate, imposed in so broad a form as the honourable Member has put it.

1230. For the prevention, of famines, we have heard in evidence that there is no doubt that light railways, as branches from the main lines, would be of material assistance; are you also of that opinion?—Certainly; where the means of communication are deficient.

1231. Have you ever travelled over that light line, the Nulhattee line?—Yes; I believe I have been over that line.

1232. A light line of that kind which goes up hill and down dale, do you think would be sufficiently strong for the carriage of large quantities of rice from one part of India to another in order to alleviate famine?—I should not like to give a decided opinion, because it is an engineering question; my impression would be that it might be very useful for a time, but that a light railroad of that sort could not do as a permanent work for the carriage of heavy goods; you require something a little stronger; at least that is my impression.

1233. Your impression is that a line built the same as the Nulhattee line, which is called a light railway, would not be sufficiently strong for the conveyance of a very large quantity of rice to a famine-stricken district?—Permanently, no; as a temporary measure, yes.

1234. Would not a light line of that kind in a case of emergency be able to carry with ease a great number of troops and put them down to quell any particular rebellion that you may have in any place in India?—That is a more difficult question; I should not like to give an opinion upon it without going into the details of the capacity of the rolling stock of the line as regards carrying artillery, and so on; I think it is very doubtful whether it would be good enough.

1235. As the honourable Member suggested, of course you must have a change of carriage at the junction with the main line?—No doubt we may say generally, for military purposes breaks of gauge are exceedingly unadvisable and a very serious obstacle to the transport of troops and stores.

1236. We have had an estimate of the probable financial result of irrigation works, which I think has been said to be somewhere about 6 per cent., but those irrigation works at the present time are all in the neighbourhood of large rivers, are they not?—Yes.

1237. Of course there is a great deal of India through which no river runs, or, if it is a river, it is only a river during the monsoons; to irrigate those parts of India, of course, would entail more difficulty than the works which have already been constructed?—Yes; it is probable that the works which are already constructed are best for the country, and the best paying works that could be made.

1238. I will take the country around Reypore, Nagpore, Oomrattee, and Jubbulpore, quite in

Earl of *Northbrook*.

4 April 1878.

Mr. *Onslow*—continued.

the centre of India, in those districts, of course more than in those which you have just spoken of, to irrigate them properly would cost far more money than the irrigation works which have already been made in India in the neighbourhood of the big rivers?—I should think so; but I have never seen any plans for the irrigation of that part India.

1239. Do you think that by any efficient system we could expect a favourable result of 6 per cent. on irrigation works constructed in those districts ?—I should like to see the particular scheme before I gave an opinion. I do not think there is any probability of getting 6 per cent. from irrigation over the whole of India. It would, in my opinion, be quite out of the question to expect any such return.

1240. You have said that it was your wish when you were Viceroy to spend four-and-a quarter millions on Public Works, and I think you said that one year you did spend as much; can you tell me in that year how much was borrowed money?—Yes; in the year 1874 there was about four-and-a quarter millions spent, and the same sum in 1875; speaking broadly, the whole of that money was borrowed in both years, on account of the surplus of the years having been expended in paying the cost of the famine in Bengal.

1241. Is there not a temptation to a Financial Minister to create what I may call a fictitious surplus by borrowing more than is necessary, and not spending as much out of the revenue of the year?—The effect of borrowing more than is necessary would be to increase the cash balances, but it would not affect the revenue and expenditure accounts of the year.

1242. Would not it be easy to have furnished any year a surplus by borrowing more than you had borrowed the preceding year, and to create a surplus by borrowing year by year, more than you needed?—I think not; the form of the accounts is such that the excess of money borrowed would simply appear as so much increase in the cash balances; the loans would not appear as receipts on the revenue side of the account.

1243. One great difficulty when you spend less on Public Works in one year than you had done in the preceding year on account of your finances not being in such good condition is, that you must break off certain works which you have begun; is not it the case that very often some material loss accrues on account of the breaking off of particular works?—Very great loss has occurred in former years on account of the necessity of stopping the expenditure upon works, and that was the reason why the Government of India, some time before I was Viceroy, recommended that some definite scheme of Public Works should be laid down, and that when there was not sufficient surplus revenue over the expenditure of any year to provide for maintaining a fair rate of expenditure on the works, the balance should be borrowed, so that the works might be continued without those checks to which the honourable Member alludes.

1244. I think in your own time four-and-a-quarter millions was the maximum spent on Public Works; then, I think, you said that during the last year you were in India, when Sir William Muir was Financial Minister, you had to reduce it to three-and-a-quarter millions? —Yes.

1245. Then you proposed to spend that year 500,000 *l.* less than you had done in the previous year; is it your opinion that the fact of your spending so much less than you had done previously was a detriment to the construction of the works which had already been begun?—I think not, because we postponed the commencement of new works; the works were then going on on such a scale that the expenditure might be reduced some half a million without any detriment to their progress.

1246. You did not stint the works which had already been begun on account of your spending 500,000 *l.* less than in the year 1876-77?—I do not think that any work was so stinted as to occasion additional permanent cost; at any rate that was the desire of the officers who made the plans for the year.

1247. Then I may take it as your opinion, that there is always that difficulty when you have to spend less in one year than you had done in a previous year, namely, the difficulty and loss on account of works being stopped?—Certainly; I may add that the present condition of the Public Works in India is very much sounder in that respect than it ever has been before. There had been very large works going on, such as the East India Railroad, and other great trunk lines of railway, and there had been great irrigation works which it would have been impossible to check or stop without great sacrifice. At this present time the works undertaken are much smaller in extent, and I believe that in a few years the expenditure on Public Works, if unfortunately the condition of the finances should render it necessary, might be very considerably reduced without any considerable sacrifice. That was alluded to by me in the same observations made in 1875 to which I have referred before. I said, "I may observe that we are now in a far better position than we have been at any former time, in respect to our liability for the completion of railroads and irrigation works. So long as the main lines of communication, such as the East Indian and the Great Indian Peninsula railways, were in progress, a very large liability rested upon the Government for their completion, a liability which, as those railroads were constructed by guaranteed companies, could not be set aside whatever financial exigencies might arise. Now that the principal lines of communication are completed, and the works under construction are of a more limited character, the liability for the future expenditure necessary to complete works under construction is considerably diminished. The rate of progress, moreover, is now almost entirely at the command of Government, because the works are mainly constructed directly by the State, instead of through the agency of guaranteed companies. I believe that in the course of a few years our liability will never at any time much exceed the annual sum which is appropriated to the construction of such works. Thus, in the case of a failure of any great branch of our revenue, or if other calls, such as those of war, should fall upon the Government, we should be able within a very moderate time, to contract our expenditure without subjecting the country to the loss which would

Mr. *Onslow*—continued.

would be occasioned by abandoning important works before they are brought into remunerative operation." That will show the honourable Member that that important point had been considered, and we thought we were in a fairly sound condition with respect to it.

1248. Still these works which you mentioned as having been finished, were new works which had been proposed to be made, whether irrigation or railroads, and therefore the expenditure would go on just the same on Public Works?—I was under the necessity of somewhat curtailing the expenditure. I do not believe that there was any waste of money in consequence.

1249. As to the Indus Valley Railway, the country in the neighbourhood of the river is to a certain extent prosperous, although perhaps not quite so much so as in the neighbourhood of the Ganges; it has been said by General Dickens and others, that that Indus Valley line will not be a paying line; but do you not think that as soon as that line is finished to Lahore, and easy communication between the North-west and Kurrachee is obtained, in a few years it may be a paying line?—I should not like to support that opinion. I believe that the best authorities are of opinion that it will not pay. I have been down the Indus, and nobody can compare the country on the banks of the Indus with that of the valley of the Ganges. The valley of the Indus is mainly a desert.

1250. The line from Lahore to Peshawur is supposed not to be a paying line, but only a military line; but will it not, in your opinion, be the means of developing a trade between Afghanistan and India proper?—I should doubt if there will ever be a very large trade from Afghanistan, but there will be a considerable passenger traffic along that line. I have a doubt of there being any very considerable trade through the Khyber Pass; the trade is more likely to come through the Bola Pass in my opinion.

1251. Still it will be able to tap a great part of the country south of Cashmere, which is rather a rich part of the country, I believe?—I do not think anybody would have made that particular piece of line except for military purposes; it would have been too expensive to have been made, in comparison with the others, excepting for military purposes; but I may add that I consider the line of the highest importance as a military line.

1252. Then, again, from Darjeeling to the Brahmapootra, that line is not a military line, it is purely commercial, is it not?—That is the Northern Bengal Railway, and it is purely a commercial line.

1253. That line in the course of a few years will no doubt pay the interest of the money which has been borrowed for its construction?—I hope it will; we believed that it would, and I hope that it may turn out to be so.

1254. It will be the means of developing a trade north of the Himalayas, will it not, as well as in our own territory in India?—I am not myself very sanguine about the trade from Thibet being of any very great consequence.

1255. Has the line from Rangoon to Prome been begun yet?—I believe it is finished, or a great portion of it.

1256. That is purely a commercial line, is it not?—Purely commercial.

Mr. *Fawcett.*

1257. You referred to, and I think endorsed, the statement of Lord Mayo's about the discontent that had been caused in India by the increased taxation?—I said that that statement had been made by Lord Mayo, and that I felt it my duty on arriving in India to inquire whether it was so, and so far as I could ascertain it was supported by the opinions of the best authorities in India.

1258. After making those inquiries, did you come to the conclusion that it was?—I did. I did not come to that conclusion with any haste, because I thought it necessary to get from different parts of the country the opinions of officers of the Government, of the high officials, also of the officers who were most in contact themselves with the people, and of the best natives in different parts of the country. Having sent out a circular in the autumn of 1872 for the purpose of getting those opinions, we received reports from those officers, we very carefully considered the reports, and the conclusion to which I came, and that conclusion was confirmed by personal conversation with those people whom I could most trust in India, was that the opinion expressed by Lord Mayo was sound.

1259. The opinion was very short; could you kindly give it to us?—It was very short; the words were that "a feeling of discontent and dissatisfaction existed among every class, both European and native, on account of the constant increase of taxation that had for years been going on," and that "the continuance of that feeling was a political danger the magnitude of which could hardly be over-estimated."

1260. Approving of this opinion which had been expressed by Lord Mayo, after careful inquiries from those who you thought were most competent to express an opinion upon the subject, you arrived at the decided opinion that however useful Public Works may be, it would be inexpedient to carry them out if in carrying them out they would lead to very increased taxation?—Yes.

1261. Having approved of this opinion about the evils of increased taxation in India, your Public Works policy was based on the principle to which I understand you rigidly adhered, that you would not impose additional taxation upon the people of India for the purpose of constructing those works?—There was no additional taxation for the purpose of constructing those works, during the time that I was Governor General.

1262. On the contrary, you adopted an opposite policy, you reduced the taxation, and you repealed the income tax, did you not?—The income tax expired in the year 1873, and I did not reimpose it.

1263. Does your remark that there was no increase of taxation during your viceroyalty, apply to local as well as Imperial taxation?—Yes, two local taxes were taken off which were supposed to be a cause of considerable discontent; one was the non-agricultural in Bombay, and the other was the house tax in Madras.

1264. Since then you find we now have to consider a Public Works policy which is based on an entirely opposite principle, because Public Works have been constructed, and new taxation has been imposed on India within the last few months?—I do not quite see the connection between the two things. I do not believe that as regards Public Works there has been any alteration in the policy since I left India.

Earl of *Northbrook.*

4 April 1878.

Mr. *Fawcett*—continued.

1265. I am not asking your Lordship's opinion whether you think it right or not, but the fact remains, that new taxes has been imposed, and a portion of the proceeds of those new taxes is going to be devoted to the construction of Public Works, and consequently that policy which you so strongly objected to of constructing Public Works by borrowed money, is now to a certain extent being adopted by the Government of India?—I was not aware that a portion of the new taxes was to be applied to the construction of Public Works.

1266. Have you not seen the statements upon that point?—I have read the different financial statements that have been made in India since I left that country.

1267. Do you draw from those statements the conclusion that the new taxes are not going to be devoted, or any portion of them, to the construction of Public Works?—It is very difficult to say, when the whole revenues of a country come in, to what particular purpose any particular part of those revenues is applied; but I certainly did not understand the financial policy of the Government of India to be that they would put on fresh taxes for the purpose of carrying out Public Works. I understood that fresh taxes were put on for the purpose of obtaining what the Government considered to be a proper and sufficient surplus of revenue over expenditure for the year.

1268. If you create that surplus by additional taxation, and you spend that surplus in constructing Public Works, of course you do not reduce the debts; whatever you call the surplus, you are really spending a portion of the proceeds of taxation on Public Works; to what other purposes is it devoted?—If you spend the surplus in carrying out Public Works, then the new taxes would be applied to carrying out those Public Works.

1269. Is there anything to show; on the contrary, do not the statements show that whatever may be the intention with which this taxation has been imposed, that the surplus would be at least going to be spent in Public Works, and not devoted to any other purpose?—I should not like to answer that question, because I am not able to follow it quite, and I am afraid that by answering it I should imply a disapproval of a particular policy without intending to do so. I can understand this, that the Government of India might have considered it necessary to curtail the expenditure upon reproductive Public Works, so as to save sufficient money to reduce the amount of new taxation which they were going to put on. I think they have done that, to a certain extent. I believe that the expenditure upon "Extraordinary" Public Works has been curtailed, and that now it is less than it was when I left India; so that it is probable the Government of India have done that, as far as they thought it right to do it.

1270. If they are going to borrow less for Public Works, but are going to spend the same amount through the year as they did when you were in India, it comes to this, that although less is borrowed, the deficiency is made up by increased taxation?—My impression is that they have reduced the amount expended upon "Extraordinary" works. I think that the expenditure has been reduced to something like three millions, but I am not certain about it. My information is only gathered from what I have seen in the public statements upon the matter.

Mr. *Fawcett*—continued.

1271. Have you seen the statement which has been laid upon the Table of the House, and represents the opinion of the Government of India, as contained in Sir John Strachey's statement, that during the years to which you have referred there was no surplus; and he says distinctly that, taking a review of the years between 1869 and 1876, seven years, excluding famine charges, the ordinary revenue only barely met the ordinary expenditure; if that statement is correct, the whole of the Public Works Extraordinary must have been constructed of borrowed money?—I could not follow that part of Sir John Strachey's statement, and I do not think I should agree with the way in which he put forward the figures.

1272. Then, would you agree with another statement of Sir John Strachey's, for which the Government of India make themselves responsible at the present time, that before those new taxes were imposed in India, the ordinary revenue only just balanced the ordinary expenditure, and that therefore all the extraordinary Public Works must come out of borrowed money?—As regards the estimate for the year, I should think that would very nearly represent the state of the finances. My impression is, that at the end of the year there will probably be a fair surplus, as the estimates in India are usually very cautiously made.

1273. It is not only an estimate, but, according to this statement, an actual fact, because he says, referring to the year about which I am now speaking, namely, 1876–77, "excluding famine charge, I come to the conclusion" (and so far as I can discover, the Governor General and none of the Council have contradicted the accuracy of this statement), "that the ordinary revenue is barely sufficient, if it is sufficient, to meet the ordinary expenditure"; that means, it was not an estimate that I was referring to, but the actual account for the year 1876–77, and therefore the whole of the money spent for extraordinary Public Works has to be borrowed?—I have not with me the accounts for 1876–77. My impression is that for 1876–77, excluding famine charges, the surplus was something between half-a-million and a million of money; that I believe was about it. But I do not think that that is a sufficient surplus; I think that the surplus ought to have been larger. In fact, in 1876–77, in framing the Budget of the year, I was anxious to increase the revenues by something, so as to produce a larger estimated surplus for that year.

1274. However high the value at which you estimate the utility of the Public Works in India, there is nothing that has occurred since you left India to change your mind as to the impolicy of constructing Public Works, if the construction of those Public Works involves additional taxation?—I can only speak from the impressions which I received during the time I was in India. I do not know what the state of the country has been during the last two years; but, subject to this necessary qualification, my opinion remains the same. I have a very strong opinion that India is a country in which it is very unwise to be constantly altering the taxation, and to be constantly imposing fresh taxes.

1275. Then

Mr. *Fawcett*—continued.

1275. Then in deciding whether a particular public work ought to be constructed, besides the utility of the work, you would always regard as one most important element in determining your decision as to whether the work should be constructed or not, what was at the time, and what was likely to be the financial position of India?—Certainly.

1276. And that a work which you might cordially approve of as a very desirable work in itself, you would think ought not to be carried out, because the benefits which would result from the work you might think would be dearly purchased if the construction of the work imposed additional taxation, and produced those changes in the fiscal system of India to which you have referred?—Certainly.

1277. Therefore that would lead to the conclusion, would it not, that it would be unwise to lay down any fixed rule as to the amount which in each year ought to be spent on State railways or irrigation works, because the most important element in determining that amount is the financial position of India, and that financial position is liable to be affected by various circumstances which it is impossible with any accuracy to foretell?—That would be quite correct if you took into consideration a long series of years. But I think it is necessary, in order to carry out a system of large works, such as railroads and irrigation works, at all well and profitably, to have a scheme which at any rate must be adhered to for a limited number of years, say for four or five years. Such a scheme, in point of fact, is laid down in the forecasts before the Committee. We considered, and showed that we considered, in the financial statement for 1876, that financial circumstances might occur such as seemed to be possible then, namely, a still greater fall in the value of silver, which would oblige us to curtail our expenditure upon Public Works; not suddenly, but we should have done it within the next five years. Supposing that any great financial crisis of that kind should occur in India, I should be of opinion that it would be better even to suffer a deficit for one year rather than put on fresh taxes, if you saw that the next year, or the year after, you would probably revert to an equilibrium of income and expenditure.

1278. As I understand that statement which you gave us from your speech which you made is intended to show this, that the largest and most important public works, involving considerable outlay, had already boen constructed in India, and therefore the future Public Works expenditure would be more immediately within the control of the authorities at various short periods?—It was with that very purpose that the statement was made to show, for example, that if an absolute necessity arose, the expenditure upon Public Works out of borrowed money might gradually cease, while the receipts on the other hand, from the works being completed, would come in as revenue, and the whole of that sum of two millions, or the greatest part of that sum which we had appropriated in 1873, to be spent annually upon "Extraordinary" Public Works, would be saved and be so much to the good.

1279. Then to put it shortly, your general conclusion is this, that as the largest and most

Mr. *Fawcett*—continued.

important public works have been constructed hitherto, it will be more and more easy to adjust from time to time the public works of India in accordance with the financial position in India?—Certainly.

1280. With regard to the word "reproductive," would it not be possible to describe the Public Works under a better phrase; reproductive works include two distinct classes of works, useful works which are not likely to pay in interest on the capital, but which for other reasons, for military reasons, and with the view of preventing famines, it is desirable to construct, if India can afford it, and also include works which at the time of construction are supposed to be profitable?—I think the term "Reproductive Public Works," is not altogether the best that could have been selected.

1281. Taking the usual acceptation of the word, when you speak of reproductive work, you mean that it is commercially reproductive, and pays interest on the capital?—Yes; I suppose that would be the general interpretation given to it.

1282. Therefore, when it is said that extraordinary public works should be carried out by borrowed money, and borrowed money is employed on reproductive works, it is calculated to mislead people, unless they look into the matter carefully, in supposing that all those extraordinary works are commercially paying works, whereas it is known that some of them cannot pay?—I think so. I think the term occasionally gives rise to misconception. What the Government of India said upon that subject is contained in the second paragraph of the forecast of the 11th June 1875: "The term 'reproductive' is meant to imply not that all these works are likely to be in themselves remunerative as an investment of capital, but that their effect will be to add to the general wealth of the country."

1283. I understand you to be very strongly opposed to the system of constructing public works by borrowed money raised in England on the ground of the silver difficulty?—I have a very strong objection to it. I would very much rather not do so. The objection to increasing the liabilities in gold must, I think, be patent to the Committee.

1284. In order to show what the financial position of India is with regard to public works at the present time, are you aware how much money has been for the construction of public works respectively raised in India and in England during, say, the last five years, or during the last three years?—I do not know what has been done since I left India. I know generally, but I could not give the Committee the precise figures.

1285. At the present time, speaking generally, it is the case, is it not, that by far the largest portion is borrowed in England?—In the year 1876 we recommended the Secretary of State to borrow in England; and the reason was that the state of the silver market was such that it would have been impossible, I believe, to have raised money in India, and that it would have been a very unwise financial operation to have attempted to do so.

1286. But there has been large borrowing going

Earl of *Northbrook*.

4 April 1878.

Mr. *Fawcett*—continued.

going on both for famine expenditure and for public works since the time when you gave that advice, and nearly the whole of that money has, has it not, been borrowed in England?—I am not aware of the proportion; I think two millions or two millions and a-half was raised in India.

1287. That is about it; but the amount that has been borrowed, including the famine expenditure and public works, has been 12,000,000*l.*?—Yes, I believe that it was so; and it was necessary that it should be so, because the capacity of the Indian money market is not sufficient to obtain that amount of money in India.

1288. During the last few years is it not an element in determining how much ought in the future to be spent out of borrowed money in the construction of public works, that the position of the money market and of Indian finance has been such that, out of the 12,000,000*l.* which has been borrowed, it has been necessary to borrow 9½ millions in England and only 2½ millions in India?—I mentioned to the Committee my own view when I was in India, which is two years ago now, was that the Indian money market could not be relied upon safely for more than between two and three millions a year, and how long that supply might continue was, of course, not altogether certain.

1289. The disadvantage which you have pointed out as resulting from borrowing money in England in consequence of the interest having to be paid in gold, whereas the Indian revenue is obtained in silver, applies, does it not, to all time in the future?—It is always disadvantageous in the sense of its being uncertain; but supposing the tendency was for the value of silver to rise, no doubt India might get very considerable profit by borrowing in England in gold.

1290. But whatever the value of silver may be now, though it may be slightly raised, you cannot get rid of that great element of uncertainty that you may find at any time if you had large gold obligations that your financial position became most critical, or seeing that the whole of your revenue is received in silver, and therefore it is an element of risk?—It is no doubt an element of risk, and a most serious element of Indian finance. Perhaps the Committee will allow me to mention the figures upon this, because they are not generally known. In the year 1872-73 the cost of the remittances to England to meet the payments in gold, which is the real meaning of the expression "loss by exchange," in the accounts, was 765,109*l.*; it remained about the same during the next two years, 1873-74 and 1874-75; in 1875-76 the cost was 1,429,722*l.*; and in 1876-77, which was the worst year we had, it was 2,332,000*l.*, so that the fall in the value of silver made a difference of a million and-a-half in the finances of India for that one year; that is to say, supposing that the value of silver had been the same in 1876-77 as it was in 1872-73, there would have been a surplus in the year 1876-77 of two millions; and that is an important consideration in any discussions on Indian finance; because it is quite clear that that is one of those unfortunate occurrences for which no Government could be responsible, and which turned upon the accident that the standards of England and India are different.

Mr. *Fawcett*—continued.

1291. Serious as are the consequences which were thrown upon the finances of India during this year by the fall in silver, a corresponding fall in silver would produce still graver consequences at the present time, because the amount that has to be remitted from India to England in consequence of the increase of the home charges, and the increase of Indian debt in England has considerably increased since that time?—Certainly it is worse now than it was before; the amount of the remittances from India to England being greater, the loss would be still greater.

1292. You have referred to a financial statement which, I think, has been put in, of Sir William Muir, who was your Finance Minister in 1874-75?—It was published in the "Gazette" of India; I do not know whether it has been laid before Parliament.

1293. In that document you would probably remember an expression which he used about this subject to which you are referring; he said that the fall in the value of silver casts a shadow over Indian finance, and the seriousness of the possible loss can scarcely be over estimated, or words to that effect?—I believe that the Budget of 1876-77 was issued just at the time when silver was at the lowest, and when we were very seriously alarmed as to what was going to happen.

1294. At the time when Sir William Muir, who was your Finance Minister, said that the fall in silver caused a danger to Indian Finance, the gravity of which could hardly be over-estimated, silver was then quoted at 54*d.* an ounce; that is about the price of it at the present time, is it not?—It may be so. It went lower immediately afterwards or immediately before.

1295. But still the magnitude of this danger arising from a possible fall, or from a continuance of a fall in silver to Indian Finance is considerably increasing, is it not, under a policy which increases the Indian debt held in England?—It is so; but it would hardly be fair to call it a policy, because it is a necessity.

1296. Under the system would perhaps be a fairer word?—It having been necessary to spend this large sum of money in saving the lives of the people during the famine in Madras, it could be raised in no other way except by loan in this country in gold.

1297. You have put in a statement by General Rundall; was not he the engineer who advised the Government to purchase the Orissa works as a good speculation?—I cannot tell; I was not in India when the Orissa works were purchased.

1298. Judging from the past experience of the Orissa Company and the Madras Irrigation Company, and one or two others which have been told us by General Dickens, have you any opinions which you would like to express about the policy of public works being constructed by private companies in India?—If such a suggestion had been made when I was in India, unless it had been an exceedingly simple work, such as a canal or a work of that kind, I should have opposed the construction of irrigation works by a company.

1299. And also any public works like railways?

Mr. *Fawcett*—continued.

ways?—I should be exceedingly glad to see railways constructed by companies in India, provided they would do it without a guarantee.

1300. Provided also that you thought there was any security that what happened in the past would not happen in the future, namely, that if the company turned out a dead failure the Government would not be persuaded to buy it; because that has happened, has it not?—I have heard something about the Orissa works, and read something about them; but I would rather not give an opinion upon that matter. It was not done when I was connected with the Government of India.

1301. In considering the question of how public works should be constructed in India, whether they should be constructed partly under a Government guarantee, or whether they should be constructed by a private company, one very important element to take into consideration is this: that if, for instance, we take a disastrous railway speculation like the Port Canning Railway, the moment the thing turned out a failure the Government of India might be almost compelled or induced to buy it?—Certainly that would be necessary; and I think any wise Public Works Minister in India would take care not to recommend the construction of any railway by a company, even without a guarantee, unless he was satisfied that there was a reasonable probability that the company was a sound one, and that the railway was likely to pay a fair interest upon the expenditure.

1302. Knowing the constitution of the Government of India, would it not be also a very important element to take into consideration that in the case of works constructed by capital supplied, as is usually the case, by English investors, if the company turned out a failure, pressure would immediately be brought upon the authorities at home to compel the Indian Government to take over an unpaying work?—I think it is very likely that those interested in the railroad would wish it done.

1303. Then you would consider that one objection to allowing those public works to be constructed by private companies?—I do not think I should say that exactly, because I have had to do with guaranteed railways, and I do not think that any improper influence has been brought to bear upon the Government up to the present time with respect to the guaranteed railways. People who have gone into investments of that kind in railroads in India would naturally wish to have as much profit as they could, and it is certain that they would have some influence in this country; but I am not prepared to say that because they may possess that influence therefore I should be against giving a railway undertaking to a company without a guarantee. I should like myself to see Indian money invested in Indian railroads; and that has begun to a certain extent.

1304. But there is no analogy between a company carrying out a public work under a guarantee taking the risk to themselves, because in India something more than the market rate of interest has been guaranteed on those works which have been carried out, and consequently investors could not lose if the company did not pay a shilling, and would still make a remunerative result themselves?—If the money was raised at a fair rate at the time.

1305. Of course, if 5 per cent. be guaranteed, the guaranteed company must gain, however much the Indian people may lose; for instance, there are works on which there is a guarantee of 5 per cent. which have always stood at a considerable premium in the London money market, although they have not paid ½ per cent.?—Of course 5 per cent. now upon Indian securities would command a very considerable premium in the market; probably Indian 4 per cent. securities are a little above par, and, therefore, 5 per cent. securities would be at a considerable premium.

1306. Recognising the possibility of this financial pressure being brought to bear upon the Home Government, if a public work were constructed by private individuals without a guarantee, and recognising that it would not be so likely to be bought if the Government were more in a position to resist that pressure, you think it would be more desirable that those public works without guarantee, if constructed by private companies, should be constructed by Indian capital, rather than by English capital?—Yes. I should very much like to interest the people in India in making railroads.

1307. Therefore, that would be what you describe as a financial and political advantage?—Both.

1308. Have you any opinion which you would like to express upon whether the establishment of Cooper's Hill College sending out to India a fixed number of young engineers every year does not diminish the chance of the natives obtaining first class employment as engineers?—I should be afraid that it would somewhat interfere with the chances of the natives being employed.

1309. And that a native, if even he is placed in the same position as an Englishman in obtaining employment in the Public Works service, must virtually incur the trouble and expense of coming to England, and to compete for admission to Cooper's Hill?—I should not think that; a good many natives go into the Public Works service in India direct. A good native is certain of being advanced and put into good positions. The difficulty is to find men who are really fit. Many natives in India will do book-work beautifully, and pass examinations, but when put to look after the men on works, they do not answer well. There are some up-country natives who are excellent men, and who manage men very well, but who cannot pass examinations; but still there have been and are excellent men, natives, employed upon public works. I remember myself seeing at the great dam of the River Soane a baboo, who, as the Committee know, is a Calcutta native, who is supposed to be a somewhat effeminate mortal, who had been superintending part of those works up to his middle in water constantly during the whole day, and in a most efficient manner.

1310. Is it not the fact that the establishment at Cooper's Hill, the principle of which is to send out a certain fixed number of young engineers to India every year, has produced an im-

Earl of *Northbrook.*

4 April 1878.

Mr. *Fawcett*—continued.

pression in India that there is less chance of the natives being employed, and that fewer young natives go to the engineering colleges, and consequently some who may be capable may not think of entering the service in which employment is not certain?—I do not know what impression may have been produced. I never heard of such an impression, and I do not remember that any complaint of the kind was ever made to me.

Sir *George Campbell.*

1311. With regard to the statement of Colonel Rundall, which has been put in, are you aware that Colonel Rundall was the chief engineer of the Orissa Irrigation Company?—I believe he was.

1312. You have quoted the opinion of Lord Mayo as fortifying you in the view that it is not desirable that public works should be constructed in India if they involve taxation?—I beg pardon. I did not intend to quote the opinion of Lord Mayo upon that point. I quoted his opinion as having been given on a very important occasion, before I went out to India, to the effect that there was considerable discontent in the country in consequence of the recent increase of taxation; and I quoted his opinion as being one of the reasons which led me very carefully to inquire, when I arrived in India, whether that opinion was supported by the opinion of those people in India in whose judgment I placed reliance, but Lord Mayo's opinion was not given with reference to public works.

1313. I think your Lordship used that opinion of Lord Mayo as fortifying the opinion which you yourself expressed, that it would not be desirable to construct public works if those public works involved additional taxation?—Doubtless. I have a very high opinion of the eminent qualities of Lord Mayo, and I attach very great weight to his opinion given in that way almost at the end of his career, and certainly his opinion as expressed would be distinctly against doing anything deliberately which would require an increase of taxation unnecessarily.

1314. Are you not aware that Lord Mayo, in certain cases, was in favour of constructing public works, to be recouped by taxation if necessary; for instance, that Lord Mayo at one time advocated a compulsory cess upon land for irrigation?—I am aware of that. This opinion which was expressed by Lord Mayo was, I believe, expressed at a later time than the time when he was considering a compulsory cess for irrigation purposes.

1315. You are not aware that Lord Mayo, in the latter part of his administration, was strongly in favour of imposing local cesses for local public works, and that, in particular, he was personally very largely instrumental in the decision under which the Government of Bengal imposed a road cess for local works?—I believe what the honourable Member states is correct with regard to local cesses, and that Lord Mayo approved of the Bengal road cess which was carried out under the supervision of the honourable Member when Lieutenant Governor of Bengal with discretion and success.

1316. In your opinion has that road cess been

Sir *George Campbell*—continued.

successful, and have the people sufficiently appreciated the benefits of it to justify the tax which has been imposed?—That was my opinion. I think that the road cess was a proper measure, and that it was very carefully carried out.

1317. With regard to public works as a means of communication, did you at the time of the Bengal famine have any reason to feel that there was some disadvantage in dealing with that famine on account of the position of the East India Railway as an independent concern, and not wholly under the control of the Government?—I saw in the Minutes of Evidence that the honourable Member, when giving evidence himself the other day, had alluded to this matter. It is true that at one time during the Bengal famine, when we were sending up large quantities of rice from Calcutta to Behar, we had some difficulty in consequence of the disinclination of the local officers of the East India Railway Company to increase their rolling stock sufficiently; but that difficulty was very temporary, and it was soon remedied after a communication between myself and the authorities of the East India Railway Company, and the only hitch that occurred was a very slight one. The local officers worked very cordially with the Government officers. We sent our own engineers to the Howrah Station to assist in arranging that the rice went up in sufficient time, and, as a matter of fact, there never was any real inconvenience to the public service from the temporary deficiency of rolling stock. No doubt, supposing that that railroad had been a Government concern, we should not have had even that temporary difficulty.

Mr. *Bulfour.*

1318. You would not wish the Committee to understand that the increased taxation is so great an evil that, rather than undergo it, no expenditure on public works should be undertaken?—I think the question of taxation in India must be very carefully considered by whoever is responsible for the government of the country, but I should be sorry to give any hypothetical opinion.

Chairman.

1319. With regard to the advantage of raising money in London, and in India, if it were morally certain that silver would not further fall, or if there was any probability of silver rising, there would be no greater advantage in borrowing in silver in Calcutta, than in gold in London; you would get the present premium on your gold, and you would pay a little interest on the full amount?—Of course, but you must also consider the effect that it would have on the Secretary of State's bills on India. You get an advantage for the moment, but in the end you get a disadvantage, because you increase your remittances.

1320. Except in that which would be an extremely small per-centage; supposing there was a certainty that silver would keep at its present price, it is immaterial whether you borrowed in gold or in silver?—In that case the only consideration is, where you can get your money cheapest.

1321. The

Chairman—continued.

1321. The mere fact of silver having fallen down to the present point would not affect the prospective loans, unless there was a fear of its falling further?—Certainly not.

1322. It would be just as wise a thing to borrow in gold in London, as it was to borrow in gold in London before the unexpected fall in silver had produced the great disturbance?—I should say that on the whole, putting aside any question of the political advantage of borrowing in India, it is safer for any Government to borrow in the same standard in which they receive their taxes. Therefore, it is on the whole, as a matter of general principle, better for the Indian Government to borrow in silver than in gold. If they could borrow in silver in England, there would not be the same objection.

1323. Let me then sum up once more your view as to what should regulate the amount to be spent on public works; we had it from General Dickens that the Government of India contemplated an average expenditure of four and a half millions upon reproductive works, and we have it from you that your ordinary surplus was somewhere between two millions and two and a quarter millions per year, and that your view was that that surplus might be well applied and would have been, were it not for the famine expenditure, to public works; we may take it that you would like to see a state of things under which reproductive public works were provided for, about one-half by loan and the other half by surplus, and that if the finances of India should not produce the necessary surplus, the amount of the expenditure should be pretty nearly *pro tanto* reduced?—That would be my general view, but I would not lay down any hard-and-fast rule which would oblige you to do it for any particular year, because the Committee are aware that one of the main sources of revenue in India, the opium revenue, is liable to great fluctuations, and if there happened to be a failure in the opium revenue for one year, that should in my opinion make no change in the policy of public works; I would rather regulate the rate of expenditure upon the broad view of a series of years.

1324. Taking it over three or four years, somewhat about that principle would be your guiding financial principle?—That would be my own view, speaking generally, but my opinion would depend entirely upon the actual condition of things in India. Supposing that India became very much more prosperous, commercially, and there was plenty of money to be invested in India, I would then extend it further.

1325. Your present impression is that between two and three millions is as much as could be locally raised?—That was my opinion when I was in India.

1326. You would add that amount, which could be locally raised with proper economical limits, somewhere about the same average amount, year by year?—Yes, I think that would be a principle which any financier in India might safely carry out.

1327. And you would prefer that to what has been sketched out before; that is to say, that over a series of years there should be an average amount spent upon Public Works, the whole of which should be borrowed, the Government taking its chance of a surplus to pay off, as in this country, the debt raised for general purposes?—I do not quite see that there is any difference between the two principles.

1328. The last principle would be that there should be an average amount spent on Public Works, irrespective of the financial condition of India, and that the Government should take the chance of having sufficient balances to reduce their debt generally; you rather would first ascertain what would be the probable surplus available for the reduction of the debt, and apply it in aid of what was borrowed for Public Works?—Yes, if the second view of the policy which the Chairman has suggested means that you are to go on a certain rate without regard to where you are to borrow the money or what the condition of your finances is, I certainly think that would be taking rather a one-sided view of it.

1329. Have you read Lord George Hamilton's Memorandum on the subject of accounts?—Yes, I have read the Memorandum, and I have looked at the new form of account which has been laid before the Committee.

1330. And which resulted in a Despatch from the India Office to the Government of India, establishing this account as from the present year?—Yes, I have read the despatch.

1331. The general character of that change is, is it not, to assimilate very nearly the system of account keeping in India to our English Treasury system?—I am not fully conversant with the English Treasury system.

1332. Irrespective of that, do you approve on the whole of the change which is recommended?—So far as I can judge, without committing myself to details, I think it is a great improvement in the Indian accounts to exclude Public Works Extraordinary from the statement headed "Receipt and Expenditure in India and England" for the year.

1333. And also to separate the land revenue into land revenue proper, and that which arises from irrigation, adding the former to the irrigation receipts, and showin the latter in a separate part of the account?—There are objections to altering the heads of account in the financial returns of a great government, because it makes it difficult to compare one year with another. But the change seems to me to be open to no objection in principle, so long as both parts of the land revenue come into the account of the revenue for the year.

1334. You are aware that, according to the new plan, the whole of the money expended upon Extraordinary Public Works would be balanced by corresponding loans?—Yes, I noticed that.

1335. Although you have expressed an opinion which is not completely consistent with that, as to the principle of finance, yet, so far as account keeping is concerned, you do not see any objection to that form?—I do not object to it; it seems to me to be simply a matter of account, and not of principle. You nominally borrow four millions for reproductive public works, but you have got a surplus of a million and a half; so that although in the account under that head you appear to borrow four millions, in reality you only borrow two and a half millions, because you have got

Earl of *Northbrook.*

4 April 1878.

Chairman—continued.

got a million and a half of surplus, and you transfer debt to that amount from the general to the Loan Works account.

1336. Therefore, although you might not decide when discussing the expenditure on public works, not to provide the whole amount by loan, you would prefer to show it in the account as if it were provided by loan?—I see no objection to putting it in the account in that way; but I give my opinion upon the alteration in the accounts rather in a general way, namely, that I think it is a very good thing to separate the extraordinary account from the ordinary account; but as to particular details I should like to see what the finance authorities in India, particularly the Financial Secretary to the Government of India, Mr. Chapman, say about the details of the account, before giving my own opinion upon it, because he is a man who has paid more attention than anybody else to the accounts, and his opinion is well worthy of consideration.

Chairman—continued.

1337. You are aware that a despatch has been sent out with the view to the new plan being criticised in the Financial Department at Calcutta?—I think so.

1338. Would you have any objection to put in the statement from which you have been reading?—Yes; I will put in an extract from a speech made by me in the Legislative Council of the Governor General of India on the 5th of August 1875, to which I have referred (*delivering in the same*).

Thursday, 9th May 1878.

MEMBERS PRESENT:

Mr. Agnew.	Mr. Fawcett.
Mr. Balfour.	Lord George Hamilton.
Sir George Campbell.	Mr. Hardcastle.
Mr. Childers.	Mr. Sampson Lloyd.
Mr. John Cross.	Mr. Onslow.

LORD GEORGE HAMILTON, IN THE CHAIR.

Colonel JAMES CROFTON, R.E., called in; and Examined.

Chairman.

1339. WOULD you state to the Committee what post you now hold in India?—Inspector General of Irrigation.

1340. And previously what post have you occupied in connection with the Public Works Department? — I was chief engineer of irrigation for the Punjab, and I was employed before that upon various works in the Punjab and the North Western Provinces.

1341. In what capacity?—In the construction and working of them after the works were constructed.

1342. You have, therefore, a general knowledge of irrigation works throughout India, with a special knowledge of those in the Punjab and the North Western Provinces?—I am better acquainted with the North Western Provinces and the Punjab, than with Madras, or Bombay, or the rest of India.

1343. You are, no doubt, acquainted with the evidence which General Dickens has given before this Committee; do you agree with it?—Yes.

1344. The reference which was made to this Committee was to inquire into the system of public works constructed with borrowed money in India, both as regards their financial results, and the prevention of famine; General Dickens has laid before the Committee the financial results, as tested and published by the Public Works Department; do you agree with his figures?—Yes.

1345. He explained to the Committee that the revenue which was credited to irrigation works in northern India was composed of two items; one was derived from water rates paid by those who used the water, and the other was an estimate of the increased value of the land; could you explain to the Committee how the indirect results are arrived at?—The indirect revenue is first credited to the Western Jumna Canals from the year 1824–25. The results from 1824–25 to 1842–43 were obtained from a letter from the secretary to the Sudder Board of Revenue of the North Western Provinces to the Commissioner of Delhi. In this statement returns of the land revenue in the several districts affected are shown for 15 years ending 1834–35.

Chairman—continued.

It is therein stated that the increase due to the canals was calculated by instituting a comparison between the initial and present revenue (*i.e.*, in 1834–35) of a number of villages on and off the canal, and that a per-centage of the increase to the land revenue was thus arrived at, which the board considered was fairly claimable as indirect return from the canals. That indirect return was calculated by the then superintendent of canals, Colonel John Colvin.

1346. Then the indirect result is only a portion of the increase of land revenue during certain periods?—It was supposed to be that.

1347. And the Board of Revenue, or the revenue officers, test and decide what proportion of this increased land revenue may, in their opinion, be fairly attributed to irrigation?—Yes; in fact, in the later years, they have given the figures. I speak of the calculation from the commencement. The indirect revenue was not put into the accounts of the canals until about the year 1860–61.

1348. Perhaps you wish to continue your statement, or have you concluded it? — It is only the commencement. From this period, that is to say, from 1834–35, till the regular land revenue settlement for 30 years of 1842, no other documents have yet been obtained bearing on the question; the sum of 12,000*l.* has, therefore, been entered as the annual credit. For the years subsequent to 1841-42, the figures have been obtained from a return issued from the office of the financial commissioner of the Punjab in 1861. The increase for each district was given in that return; and in the statement annexed to the return it is stated that the figures were obtained as follows: in the district of Delhi and Kurnaul, the amount is the difference between the actual assessment and assessment at unirrigated rates. In Hissar, the assessment at unirrigated rates has been calculated by taking the average unirrigated per-gunna rate at the time of the late settlement on the Malgoozarie land, cultivated and culturable. In the district of Rohtuck there are no records to show the actual average rate of assessment, nor can such information be gathered from the Putwarrees papers. The rates obtaining in contiguous un-

Colonel *Crofton*, R.E.

9 May 1878.

Chairman—continued.

irrigated villages have been made the basis of the calculation. Those figures were given to us by the revenue officers of the Punjab, and they are those which are entered in the Government accounts.

1349. Are they given annually?—The same figures have been used up to the present time, although the revenue has increased largely in those districts since, but the same figures are used because the revision of the land settlement is still in progress.

1350. I perceive that, in the returns annually presented as to irrigation receipts in the North Western Provinces and the Punjab, the amounts annually created by indirect receipts, you say, do not vary, as they are taken for a certain period, and that period is coeval with the land settlement?—The description that I have given applies only to the Western Jumna Canal, the oldest of all the canals. The next oldest is in the North Western Provinces, the Eastern Jumna Canal. Although that canal commenced working in the year 1830–31, no indirect revenue was credited to it until the year 1862-63. There were no means of ascertaining it.

1351. And subsequent to 1862–63, how were the figures obtained?—Subsequent to 1862-63 the figures were obtained from the revenue officers of the North Western Provinces, and when the settlement was revised, as each settlement was completed, the amount that was to be credited increased as each district was settled.

1352. How did the revenue officers, if they had no data up to 1862, arrive at the amount which might fairly be attributed to the irrigation work, as it had been in existence long before?—There was no credit until 1862–63, when they began to revise the settlements.

1353. The amount credited to irrigation would be the difference, would it not, between the land settlement in 1862 and some previous years?—Not exactly; it would be the difference between what was the exact revenue in 1862–63, as calculated then, and what it would have been if there was no canal. Perhaps I can explain it best by reading the orders of the North Western Government to the settlement officers, which are dated the 17th of August 1861. "It is of importance to Government to know, in all districts benefited by canals, to what extent the finances have been increased by their influence. Therefore, in fixing the jummas of canal villages, the collector should consider and estimate, as closely as the case admits, what part of the increased revenue is due exclusively to the increased value of each estate caused by canal irrigation; that is, he will estimate as nearly as possible what the assessment of such estate would have been had there been no canal; and the difference between that assessment and the actual jumma determined, will be set down as increase attributed to the canal."

1354. As I understand that calculation, the revenue officers estimate that there would be a certain increase or increment to the land revenue if there had been no canal, but that the increase or increment is greater in consequence of there being a canal?—Yes, in consequence of there being a canal.

1355. But they did not credit the canal with the whole of the increase of the land revenue between the two periods; that is to say, they

Chairman—continued.

allow something for the natural increase of the value of the land?—I understand so. It is altogether a calculation made by the revenue officers, with which we had nothing to do, but when the canal officers in the Punjab were called upon to state from the beginning as far as the records go, how much of indirect revenue is credited to canals, they took up the old record for the Western Jumna Canal, which goes further back than any other of those which I have read, and is the first document that we have bearing upon the subject. In explanation of that perhaps it will be interesting to the Committee if I read this extract from the report of Colonel John Colvin, which accompanied his statement, and which was written about the year 1834–35, shortly before he left India for good. "In explanation of the comparative small returns with such works (up to 30th April 1831) I may possibly be obliged to be more diffuse than I would have wished, to be enabled to convey a correct idea in regard to both the present results shown by these papers and the future prospects. And first I have to notice as having general reference to all the canals the often repeated declaration of the Government to the superintendents, as their main rule of guidance, that the object of Government in collecting a rent through them was not so much to form a productive source of revenue from the actual price paid for the water, as to give them an efficient control over its expenditure by making it of value sufficient to prevent its being wantonly wasted; and that they looked alone to the general improvement of the country as the source from which they should derive the return adequate to the outlay. This announcement completely prevented the superintendent disposing of the water, so far as irrigation was concerned, to the best advantage, and led to the settlement of a fixed rate of assessment so low that it is not sufficient to prevent carelessness, entailing much waste of water; from which it may be presumed that the instructions of Government have been fully acted up to, and the rates levied sufficiently moderate." The opinion of the Board of Revenue of the North Western Provinces on Colonel John Colvin's statement is this: "The board are of opinion that Colonel Colvin has adopted the best mode of ascertaining the indirect revenue obtained from the canals by instituting a comparison between the initial and present revenue of a number of villages on and off the canal, and carrying the increase per cent. of revenue which the former gives in excess of the latter to the account of canal irrigation."

1356. There are other irrigation canals besides those two which you have mentioned, of which the indirect receipts are annually credited; is the principle of assessment the same also?—Similar orders to this, of which I have not a copy, were issued to the revenue officers in the Punjab about the same year, 1861, by the then financial commissioner of the Punjab, and they calculated the indirect revenue in their different districts which were affected by the existing canals, the result being a statement which was given to the Public Works Department in the Punjaub in the year 1861-62, and from that the indirect revenue has been entered in the Government accounts.

1357. The land settlements are generally for a period of 30 years, are they not?—Yes

1358. So

Chairman—continued.

1358. So that any increase on the land assessment during that period is credited to irrigation?—If the assessment was for 30 years, the land revenue would not be altered during the 30 years.

1359. But the people calculating certain land would, as I understand it, pay a larger sum for the rent of land which is irrigated by water?—They might pay it in the shape of rent, but not to the Government revenue. They would pay it to the landlord, if there was a landlord between them and the Government, but the Government revenue would not be increased for the term of the settlement.

1360. The direct revenue they pay in the shape of water rates?—Yes.

1361. How do they pay the indirect revenue if it is not in the shape of increased land revenue?—This statement was made out by the revenue officers. They took up the assessment of the villages as it is described for the north west, and compared it with what the assessment would be if there was no canal at all, so far as they could estimate.

1362. Therefore the amount of indirect revenue due to irrigation does not vary during the period of land settlement?—Up to the present date it has not varied.

1363. And any increase in the annual receipts due to irrigation is derived from payments made on account of water rates?—Made in the shape of water rates; except I should mention that under the Canal Act of 1873 power is given to the Government to impose what is called an owner's rate on lands which had been settled for some period or permanently. It gives them power to assess up to the amount which would be assessed if the actual land assessment was a fluctuating one, if the land is irrigated subsequent to the settlement of the revenue.

Sir *George Campbell.*

1364. Does that Act apply to the Punjab?—Yes, and to the North West Provinces; the Act applies to both.

Chairman.

1365. And the owner repays the Government a certain portion of the increased land revenue, or increased rate, which he derives from his tenant?—He derives a higher rent from the irrigated land from his tenant, and then the Government take a portion or a share of that also, that is in excess of what the land was assessed at at the last revenue settlement.

1366. Could you give us the number and date of that Act?—It is No. 8, of 1873.

1367. Has it been put in operation?—The Act has been put in operation, but the owner's rate I do not think, so far as I can recollect, has yet been levied in the Punjab.

Sir *George Campbell.*

1368. How is it in the North Western Provinces?—And I do not think it is in operation in the North Western Provinces; it is not entered in their accounts.

Chairman.

1369. The revenue officers, in estimating the amount of indirect revenue due to irrigation, consult, I assume, with the Public Works officers who are in charge of the various canals?—So far as to ascertain what are the areas of irrigation in the villages.

1370. Is this indirect revenue accepted by the Financial Department as correctly credited to irrigation?—The Financial Department have never entered it in their accounts.

1371. There is an annual report made, is there not, of the revenue derived from irrigation works by the Accountant General of the Public Works Department?—Yes.

1372. Is that report submitted to the Financial Department?—I cannot answer that question.

1373. The figures contained in it are used by the Finance Ministers in making their statements, are they not?—The public works returns of the direct revenue are used by the Financial Department.

1374. And some Financial Ministers. Sir William Mure and Sir John Strachey have quoted the indirect returns which would be taken from that annual report, I presume?—Yes, from that annual report. We have only those accurate annual reports for the Punjab, the North Western Provinces, and Bengal.

1375. Then, as regards the province of Bengal, you think that these annual returns which are made as regards the indirect revenue due to irrigation are fairly accurate?—Fairly accurate; but I believe them to be under the mark.

1376. You mean that they do not credit the irrigation with a sufficient portion of the increased land revenue?—Not altogether; in some instances, yes.

1377. General Dickens, in his evidence, gave us, including both direct and indirect receipts, a return on the various works throughout the Presidency of Bengal, and the results are very variable, showing that the per-centage of the total return due to irrigation is higher in the Punjab than in the North Western Provinces, and considerably higher than Lower Bengal; can you account at all for this difference; is it due to climate?—In the Punjab it is to be ascribed to the Western Jumna Canal, which is the oldest canal, and has given the largest returns of any that has yet been constructed in Northern India, and also owing to the inundation canals, on which the expenditure of the British Government has been very small.

1378. The inundation canals are old native works, are they not?—Yes.

1379. And the Government take the whole of the revenue derived from them, but they charge a per-centage only on the capital which they have themselves expended?—Yes, which they have themselves expended.

1380. The rainfall in the Punjab is very small annually, is it not?—Very small.

1381. And cultivation in many parts of the Punjab is impossible without irrigation?—Yes, in some parts of the Punjab the rainfall is at times as low as two inches in the year.

1382. You have also, in the Punjab, rivers as a source of supply, which are permanent and not dependent upon the rain?—Yes, not dependent upon the rain in the plains.

1383. In the North Western Provinces the annual fall of rain is greater than in the Punjab, is it not?—Generally speaking, it is.

1384. And the country is favourable to irrigation?—Yes.

1385. When you take the sums which have been

Colonel *Crofton*, R.E.

9 May 1878,

Chairman—continued.

been expended in the Lower Provinces of Bengal upon irrigation, there is an actual decrease, is there not, in the per-centage of return?—At present that is so.

1386. To what do you attribute this; is it to the fact that there is usually sufficient rainfall to enable the ryots to carry on cultivation without irrigation?—In the case of Lower Bengal, that is where the Orissa project has been constructed, the rainfall usually is sufficient; but periodically there is a deficiency, and then the water is required.

1387. But in Behar, and that part of Bengal which is above the Ganges, the rainfall is usually sufficient, is it not, for purposes of cultivation?—Water would always be useful for irrigation in Behar, even in ordinary years.

1388. Are there any canals which have been constructed by the Government in that part of India?—The Soane Canal.

1389. Is there any canal north of the Ganges, in Northern Bengal, which has been constructed out of loan money?—None.

1390. As a rule, in India, I suppose the greater the rainfall the greater is the density of of the population in that district?—Yes.

1391. And nowhere is the population so dense as in the Lower Provinces of Bengal?—Not that I am aware of.

1392. And if a drought does occur in any of those districts where the annual rainfall is sufficient, and where the population is very dense, it would be much more difficult to avert its consequences, from the mere fact of the population being more dense?—Quite so.

1393. And yet, on the other hand, it would be in those districts where the canals would probably be the least remunerative, as the population would not require them so much as in districts where the rainfall is less?—Quite so.

1394. And it would not be possible then to avert, or thoroughly protect, any district which is very thickly populated, and which has annually a sufficient rainfall, without the construction of a large number of irrigation works, which in ordinary years probably would not be utilised?—Quite so.

1395. General Rundall wrote a Paper upon the requirements of India as regards irrigation, which Paper was handed in by Lord Northbrook; are you acquainted with that Paper?—Yes.

1396. I believe you supplied some of the information?—Yes; for Northern India I supplied the information.

1397. In this Paper he gives the various areas of each of these separate Governments of the Bengal Presidency which are protected; do you agree with the figures here given as to the protection?—Generally, I do.

1398. And the result, therefore, is, taking each province separately, that out of 56,000 square miles in the Punjab, 17,000 are protected; out of 40,000 square miles in the North Western Provinces, 25,000 square miles are protected by works of irrigation; whereas in Bengal proper, out of 78,000 square miles, only 12,000 are and will be protected by irrigation works?—In the case of the Punjab, the figures given by Colonel Rundall for the total area of the Punjab must be less than what was ascertained subsequently, for in the published statement the total area is given as 104,975 square miles.

Chairman—continued.

1399. Colonel Rundall gives the area of the Punjab as only 56,000 square miles; you, I understand, put it as high as 104,000; can you reconcile the discrepancy?—It may have arisen in this way, that the culturable area given by the last returns in the Punjab is 66,358 square miles.

1400. That is the inhabited area?—The cultivated and culturable area.

1401. But there is a very small proportion in the area which is not culturable?—Very small.

1402. May we not say, practically, none?—In a great portion of it, none.

1403. So that, for all purposes of irrigation, Colonel Rundall's figures may be accepted?—Yes.

1404. Then as regards the North Western Provinces, do you accept his figures?—In the North Western Provinces, so far as I can calculate, the area of protection is somewhat less. It is, probably, 15,000 or 16,000 square miles; but where the protection is smaller, it is not the amount actually irrigated, but the extent of country which would be protected by the works from famine.

1405. By the works which are being constructed?—Which have been in existence, and which are being constructed. I may add, in explanation of that, that it was calculated, with reference to the Western Jumna Canal, by the revenue officers and the canal officers, at the revision of revenue settlement in 1842, that if one-third of the culturable area was actually irrigated during the year, that was sufficient for the protection of the country for the remaining two-thirds.

1406. Therefore, in that case, according to Colonel Rundall's return, the area protected would be three times as great as the area irrigated?—Somewhere about that; but the proportion has varied. In some places one-fourth would be sufficient, and in some places which I have seen one-fifth would be sufficient.

1407. Then, when we come to the Lower Provinces of Bengal, we find that the proportion protected by irrigation is much smaller than in either of the two other provinces, for it amounts to only 12,000 square miles, out of 78,000?—There are only two large schemes in Bengal at present existing, and those are the Soane and the Orissa schemes.

1408. I assume that there is this great difference between the proportion of land protected in the North West and in the Punjab, and that protected in Bengal, because in Bengal there is generally a sufficient rainfall for purposes of cultivation without irrigation?—Yes.

1409. And I think this is very clearly shown by the returns from the irrigation works in the three provinces, that although there had been considerable expenditure in the Lower Provinces of Bengal, there is practically no revenue from the irrigation?—As yet it is small, but it is rising. Perhaps an extract from a speech of the Lieutenant Governor, in the beginning of this year, with regard to the Soane, will show how it is developing there. He was speaking in Behar with reference to the cess that was to be put on: "After very careful consideration, I came to the conclusion that as the whole of the province of Bengal suffered when there were such famines as have occurred of late years in Orissa and Behar, it

Chairman—continued.

it was fair that a large proportion of the cost should be borne by a tax laid upon the public at large. But it also seemed to me fair, and I believe you will agree with me, if you will give the subject your unprejudiced consideration, that a share of the cost should fall on the people who directly benefit by the introduction of water to the neighbourhood of their fields, and are thus assured of a good crop at all seasons, instead of being exposed to the risk, every few years, of absolute failure. When I proposed this, I was told that the people did not want water; that they would sooner be left alone to bear the risk of famine; and I was even told that the water of the Soane was destructive to fields. Shortly after this discussion took place the periodical rains were suspended, and then we had practical proof as to whether or not the Soane water was considered injurious or prejudicial. The people clamoured for water, and to meet this demand we were forced to open our unfinished canals, by means of which we have irrigated, during the last few months, 200,000 acres of land, which would otherwise have remained waste for the year, but which are now covered with luxuriant crops."

1410. I see General Dickens gives as the departmental estimate of the per-centage, 7 per cent. upon the Soane Canal when it is finished; but at present it does not pay its working expenses?—I have not seen the last return from the Soane; it can only have been opened last year. Water was issued from it during the famine of 1873–74, but the works were then in an unfinished state.

1411. If the returns which are laid before us as regards the profit derived from irrigation works in the Lower Provinces are correct, it is quite clear that a part of the Presidency of Bengal can never be thoroughly protected against drought, except by a very gigantic expenditure, which in ordinary years would not be remunerative?—Yes, we may say so.

1412. As inspector of irrigation, what are your special duties; do you travel all over the country, inspecting the different irrigation works?—My duty is to examine all the projects that come up to the Government of India for sanction, both as regards the engineering details, the cost of construction, and the estimated revenue to be derived from them, and also, wherever there is a necessity, I inspect works going on in the country, or proposed to be commenced.

1413. I assume, therefore, that you are more or less personally acquainted with the different localities in which those large canals have been constructed, speaking now of the Bengal Presidency only?—With the Punjab I am well acquainted, and with the North Western, with nearly the whole of it; but Bengal I am less acquainted with, especially with the Orissa scheme.

1414. Such irrigation work as has been constructed since the system of Public Works Extraordinary has been in operation, has been sanctioned as a work likely to be remunerative?—Yes.

1415. Unless it held out some promise of being remunerative, it would not come under the category of Public Works Extraordinary?—Certainly not.

1416. From your experience, you would say, I presume, that the areas which are protected by irrigation are those localities of the part of the country which are most favourable to irrigation; that is to say, which permit of irrigation works being constructed most cheaply, and which also give permanent sources of supply?—Yes, I should say so generally.

Chairman—continued.

Colonel *Crofton*, R.E.

9 May 1878.

1417. And therefore we can hardly hope, I suppose, in the future to get greater returns for the irrigation works which may be constructed than to have done in the past?—No, so long as the returns, or rather the charges for water are the same as they are now.

1418. And therefore you would be in favour of proceeding with caution in sanctioning expenditure upon irrigation works?—Certainly. My own view would be, provided funds are available, to carry out work in the country so far as not to interfere with the labour rate; that is to say, to carry it out so far as we have labour at hand, to carry it on without increasing the rate of wages.

1419. Of course that is assuming that the Financial Department can supply you with the necessary funds?—Yes.

1420. I wanted rather to call your attention to a return which General Dickens, I think, prepared, or at least it was put in by the Public Works Department, containing the forecast of expenditure for 1875. In Paper 3 (App. No. 3), page 409, under the head of "General Result," there is a Table of the charge on the revenue due to irrigation works during a certain period, and you there find that in 1872-73, the income derived from irrigation was supposed to be by this estimate 50,000 *l.*, but in 1879–80, when the capital fund expended upon the irrigation had considerably increased, we find that this income of 50,000 *l.* is converted into a charge of 156,000 *l.*; how do you account for that?—That the returns from the canals are of slow growth; that there is to be a large expenditure in those 10 years; and that it will be some years before the canals are fully developed.

1421. Then it is quite clear that if the Indian Government were to embark in a much higher annual expenditure in irrigation works, the loss at the end of 1879-80 would be greater than is here estimated?—It would be greater if we spent more than is in the forecast.

1422. Therefore it is necessary, as the revenue from irrigation works is very slowly developed, not to allow too much of your capital to be lying fallow in works which are not fully in operation?—Except this, that if the works are ever to be made, they will take a certain time to develop, and that the sooner the works are made the sooner all the arrangements will be perfected as far as possible for the mitigation of famine.

1423. That is to say, that when any scheme is sanctioned, you would be in favour of the continuous application of capital to it, as if the work be stopped, that it can only be done at a considerable cost, both of establishments and of material?—Yes, it is of paramount importance to have it fixed what is to be the yearly expenditure, so that the executive may know what they have to depend upon year after year, and to so employ their establishments to the best advantage.

1424. The opinion, I think, has been expressed by one of the witnesses, that inasmuch as now

Colonel *Crofton*, R.E.

9 May 1878.

Chairman—continued.

all those irrigation works are entirely constructed by Government agency, it is hoped that it will be found possible for the Government to check the expenditure upon them; in your opinion, if a scheme were to be sanctioned on the calculation that a certain amount will annually be expended upon it, it is very difficult to reduce that annual amount without loss?—Certainly.

1425. You form your establishments on the original calculation?—Yes.

1426. And you enter into your contracts, and you provide your material upon the same calculation?—Yes.

1427. And therefore we may assume that when the Indian Government has once sanctioned a scheme, the best economy is to have it constructed as quickly as possible?—Certainly.

1428. And therefore it is all the more necessary that great caution should be exercised as to what schemes are sanctioned?—Yes.

1429. The evidence which you have given, has been entirely relating to the Bengal Presidency; you have no personal acquaintance with Madras and Bombay, have you?—I have visited the works in the north of Madras, and one or two of those in the south, the Godavery works, the Kistna works, and the Cauvery works, and others in the neighbourhood of Madras, but there are others in Madras which I have not seen.

1430. Did you visit those works officially?—Yes.

1431. We have heard a great deal of late about the three works which you have mentioned, which I think are known as Sir Arthur Cotton's works; those in the deltas of the Cauvery, Kistna, and the Godavery; were the conditions under which those works were constructed very favourable?—The Cauvery works were old native works, which were improved by the British Government. It is stated that at the time of the British occupation they were then irrigating some 700,000 or 800,000 acres. Our Government secured the supply of water by constructing dams across the Coleroon, and since then there have been other works carried on, some of which are only lately completed, for the more efficient distribution of the water in the delta in Tanjore. The Kistna works were suggested so far back as the year 1792; they were taken up subsequently in 1847; the design was elaborated by Captain Lake, now Sir Henry Lake, and was approved by Sir Arthur, then Major Cotton. When I say they were taken up, the designs were drawn out in 1847, but the actual construction of the works was not commenced until 1852. The Godavery works had been commenced before that time. There is this difference in all the three works from those in Northern India, that the channels are shorter for a similar area of irrigation, and that there are fewer engineering obstacles in the way of deep cuttings and greater slope of country; and at the time that they were made the rate of wages was low. Then the people had been accustomed to what were called wet rates, or irrigated rates, as they had been irrigating from tanks and other old irrigation works, and the rate that was put on was simply the old rate for irrigated land; so that the irrigation developed much more rapidly there than it does in North India, where the people were unaccustomed to irrigation before. Those were the main differences which struck me.

Chairman—continued.

1432. Upon the whole, financially, those three works have been a great success?—No doubt. Then, in addition to that, there is the advantage of the cheap water communication which exists through the Kistna and the Godavery canals. The roads were few and bad. In parts of the district that I went over there were no carts to be seen, nor any means of carriage, except by boats on the canals, and on land by bullocks and ponies; the boat traffic, in consequence, has been developed to a very large extent in both the deltas.

1433. Then I may assume that it would be about impossible to find more favourable conditions than those under which these three works were constructed?—They were very favourable conditions; I ought also to add that the proximity of the material for making their dams was an additional advantage to them. In the case of the Godavery dam, and the Kistna dam, the stone was close to the works. In Northern India stone is seldom used. The only work there in which it is used to any large extent is the new Agra Canal, where the stone is close to the site of the work, below the city of Delhi.

1434. As Inspector General of Irrigation you must be pretty well acquainted with the whole of India; are there any districts in British India in which you think irrigation works could be started with the same chance of success as that which has attended the works in those three deltas?—Not at present.

1435. If the rest of India at all resembled those localities, either as regards the supply of water or the slope of the ground, you would have no hesitation, I suppose, in recommending a very large outlay upon irrigation as likely to be remunerative?—I would judge of each scheme that might be put forward on its own merits; I could not answer the question generally.

1436. But you certainly would advocate irrigation in any districts which at all resemble those three deltas?—Yes.

1437. I presume it is because, so far as you are aware, there are none of those large districts which do resemble them, that you would not be in favour of constructing works at all resembling them in other parts of Madras?—I am not aware of any other similar localities in Madras.

1438. In the evidence which General Dickens gave before the Committee, he pointed out that one of the great difficulties in Madras was the want of permanent sources of supply; I believe there are only three rivers in the Presidency of Madras whose sources of supply are not affected by the north-east monsoon?—I can only answer that question generally. There are, so far as I know, five or six rivers whose sources lie in the Ghants, and they would be supplied by the south-west monsoon. They are the Godavery, the Penaar, the Cauvery, the Tambrapoony, and one other, but I am not so well acquainted with Madras and its facilities for irrigation as with Northern India.

1439. Is there any system of indirect receipts from irrigation in Madras and Bombay?—It is almost all indirect receipts in Madras and Bombay; that is, it is included in the land revenue.

1440. But at present there are not means of accurately ascertaining how much is due to irrigation, and how much to the increased value of the

Chairman—continued.

the land?—We have not the returns; up to the date that I left India the returns had not been sent in from Madras or Bombay.

1441. The great mass of irrigation in Madras is derived from tanks, is it not?—A considerable portion of it.

1442. And those tanks depend for their supply entirely upon the rain?—All, except a very few.

1443. Were they of much use during the late famine in Madras?—The Committee which is now sitting in India will get at the facts with regard to the late famine. I left India a year ago.

1444. We have seen a statement by Sir Richard Temple to the effect that the tanks through the tract of country which he visited were entirely dry?—I have seen that statement. I may observe that the only tank that I have seen is in the Bombay Presidency. In November 1876, I saw one of the large tanks in the district of Sholapore in Bombay, and at that time there was sufficient water in the tank to have lasted, at the rate of expenditure then going on, for a year.

1445. That was just as the famine was beginning, was it not?—I may say it was the height of the famine.

1446. In order fully to protect Madras from the effects of drought, it would be necessary to have some other system than that which is in force now, of tanks mainly dependent for their supply on the rainfall?—It would be advisable to supply the tanks as far as possible from the perennial sources of supply, from the rivers.

1447. Are you able to give an opinion as to whether that is possible or not?—No.

1448. The money which has been spent upon these tanks is not included in the expenditure under Public Works Extraordinary?—No; with one or two exceptions it has not been spent upon tanks.

1449. The great bulk of those tanks were constructed by natives, and those few which have been renovated or enlarged, or entirely built by the British Government, have not come under the head of "Public Works Extraordinary," for the money has heen found out of revenue, and not out of loan?—The money for those tanks has been taken out of the current revenue.

1450. With regard to the tanks, are they under the Public Works Department, or are they under the revenue officers?—Some few of them are under the Public Works Department, but the greater portion are under the district revenue officers.

1451. What means have the district officers of getting funds, either to enlarge those works or to renovate them?—I am not acquainted with the Finance Department of Madras in that way. Those were points that did not come up to the Government of India.

1452. You are acquainted, are you not, with the Orissa Scheme?—So far as the records are concerned, and I have seen portions of the channel.

1453. That was recommended, was it not, upon the ground that the locality very much resembled that in which Sir Arthur Cotton had constructed his works in the Deltas of Madras?—The Orissa Scheme originated in the damage done to the country by floods, and in the year 1858 Sir Arthur Cotton was deputed by the Government of India to report as to the best measures to prevent this flooding. He reported that not only was a flood project required, but that a system of irrigation was required, and canals, which would open up cheap communication by water for Orissa, as it was then cut off from the rest of Bengal. In all those deltas, in addition to the irrigation, they have the advantages of works of protection from flood. There are embankments on the Godavery; embankments on the Kistna; and embankments in the Tanjore Delta; and in Orissa a great portion of the expenditure has been in protecting the country around; for instance, the city of Cuttack was very nearly being carried away by the floods previous to the construction of those works, and it may be said now to be practically secure.

Chairman—continued.

1454. You are not acquainted with, or perhaps you do not recollect the Reports of Sir Arthur Cotton, upon which the Orissa Scheme was founded?—I have not seen those reports for sometime, but the notes that I have are extracted from a Report of Sir Arthur Cotton's.

1455. He anticipated, did he not, a very large return?—Yes, he anticipated a large return.

1456. At present those works do not pay their working expenses?—Up to the present time they do not; but it must be borne in mind that the works as they are constructed now were made for a very much more extensive scheme than has been carried out. There were large and expensive portions of those works which would not have been constructed if it had been only contemplated to irrigate the amount that is now irrigated.

1457. Do you think that if a larger expenditure had been incurred, the return would have been any better?—I think so.

Sir *George Campbell.*

1458. Would you be good enough to name any particular works which are constructed, which would not have been constructed, but for the cause you mention?—Partly the High Level Canal.

1459. It is in use now, is it not?—To a very small extent; but it would not have been anything like the size that it is now if it had not been intended to be a large navigating channel. Sir Arthur Cotton's first estimate was 1,300,000 *l.* to irrigate 2,250,000 acres.

Chairman.

1460. But for the whole of the sum which he estimated, namely, 1,300,000 *l.*, it has been completed, has it not?—No, not nearly. Perhaps with regard to the Orissa works, it may be interesting to the Committee if I read what has been done for Orissa, besides what is mentioned in the returns, from the report of a speech by Mr. Eden, the Lieutenant Governor of Bengal, which was made a short time ago. "On visiting Orissa for the first time after a lapse of 18 years, it is a great satisfaction to me to witness the enormous material and moral progress which this interesting province has made during this period. Notwithstanding the fact that it has been within that time desolated by famine, I believe that there is no part of India in which the prosperity of the bulk of the people, that is to say, those having an interest in the land, has improved so much. Orissa has for thousands of years been

Colonel *Crofton*, R.E.

9 May 1878.

Chairman—continued.

held in religious reverence and esteem by the people of India; and though it has been the most inaccessible spot on the whole of the Indian Peninsula, it is more known and more resorted to by the people of other parts of India than any other place in Bengal. It is not, therefore to me a matter of surprise that improved facilities of intercourse with the outer world has brought to it such a development of prosperity as has taken place since I last visited this part of the country. I have under my consideration a scheme which is designed to give to Cuttack, and even Pooree, direct inland water communication with Calcutta, and which will at the same time open out the Orissa ports to parts of the country from which they are now excluded. I trust before long to obtain sanction to the commencement of the work, and I hope, before leaving India, to see Cuttack brought within two days' journey from Calcutta. If the work is carried out, it will, I am sure, bring this province into a condition of prosperity which will not be surpassed in any part of India; and it will be welcomed too by the religious classes from one end of India to the other, enabling them, as it will, to visit their shrines and holy places without those hardships which now involve so much suffering, and are inseparable from such a journey as now has to be faced by pilgrims. It is four years since Sir Richard Temple, my predecessor, visited Orissa. The trade, which had then risen to 77 lakhs of rupees, has now risen to 123 lakhs during the past year, and though much of this large trade was due to the export of rice to Madras and Ceylon, I see no reason to believe that these figures do not indicate a permanent expansion of trade. I see that the Orissa districts exported last year 32 lakhs of maunds of rice and paddy; the price represents an enormous increase of wealth to the agricultural classes, and the people generally cannot have failed to have benefited by this influx of money into the Orissa districts."

Sir *George Campbell.*

1461. I do not see that he attributes that to the canals in any way?—That was stated with reference to the canals. The communication of Orissa with the outer world is due entirely to the canals.

Chairman.

1462. Do you know what the total expenditure upon canals in Orissa has been?—The expenditure up to the end of 1875-76, which is the latest return that I have been able to obtain was 1,657,565 *l.*, excluding book charges, such as interest.

Sir *George Campbell.*

1463. Does that include the Midnapore Canal?—That is the Orissa Canal outlay only.

1464. The Midnapore Canal is a part of the same scheme, is it not?—Yes; the Midnapore Canal cost 644,630 *l.*, and the Tidal Canal 179,844 *l.*; these are three separate portions of the scheme which went originally by the name of the Orissa Project.

Chairman.

1465. Up to what date do you take your figures?—To the end of 1875-76.

Chairman—continued.

1466. Perhaps you never read it, but there was a Despatch sent out by Lord Salisbury upon the Orissa Canal in August 1876; do you recollect it?—I recollect the circumstance of a Despatch coming out.

1467. In order to refresh your memory I will read you one paragraph from it; it is a Despatch dated the 10th of August 1876, in which his Lordship says, "In 1871 an estimate for the completion of these works, amounting, inclusive of previous outlay, to 2,77,13,978 rupees, was submitted and approved by the Duke of Argyll; the extent of irrigation and of canal navigation supposed to be thereby provided for, being respectively 1,600,000 acres and 530 miles, and it being also calculated that the net returns would be equal to 16 per cent. upon outlay; but in 1873 a revised estimate was prepared by Colonel Haig amounting to 4,40,88,000 rupees, and now in 1876 the estimate, under fresh revision, has risen to 6,28,69,841 rupees, estimated receipts having simultaneously diminished in even greater proportion." Do you think that that is too harsh a criticism upon the results of the Orissa Canal?—The figures are those which we calculated at the time the report was sent home, which drew forth that Despatch.

1468. Up to the present time none of these canals have ever paid their working expenses, have they?—In 1876 the Midnapore Canal did not pay its working expenses according to the latest returns.

1469. There is a book which has been handed to individual members of the Committee by some gentleman from India, entitled, "The Indian Problem solved;" have you ever read it?—I have never even heard of it until this morning.

1470. I should like to call your attention to one plan which is in that book at page 269; it is an "Estimate, with map of navigation canals for all India;" have you ever seen this scheme?—Never.

1471. At page 270 you will see it is stated that "about 1,350 miles by canal and 3,150 miles by river is now in use; about 1,000 miles of canals is under construction, leaving 9,000 miles to construct, which at 3,000 *l.* per mile will require 27,000,000 *l.*, or say, 30,000,000 *l.* sterling, including four navigations quite across the country"; what should you say to that estimate?—I could give no opinion upon that estimate without examining each portion by itself.

1472. In the preceding paragraph there is a rough estimate of each line of navigation; taking one or two as samples; No. 6 is a line from Rajahmundry, on the east coast, to Surat, on the west coast, and this is estimated to cost 2,500,000 *l.*; there are several ranges of mountains between the two places, are there not?—I should say rather a high table land.

1473. And the river which is to be utilised, you perceive, is the Godavery; it has cost, as you are aware, 700,000 *l.* in getting over one barrier of the Godavery; do you think it is likely that the whole remainder of this line could be made for 1,800,000 *l.*?—I should not like to give an opinion upon that without examining the details.

1474. Do you think that one might just as well say it would take 25,000,000 *l.* as 2,500,000 *l.*?—Precisely so.

1475. If

Sir *George Campbell.*

1475. If you look at the map you will see Carwar, and you see there is a canal to be carried across from Carwar to Kurnool; are you aware that immediately on leaving Carwar you will have to ascend ghauts 2,000 or 3,000 feet high?—I have heard of them but I do not know them personally.

1476. Are you aware also that between the Nerbudda and the sources of the Chambul there are high ghauts?—I have no personal acquaintance with that part of the country, but I believe there are hills there.

1477. I presume you are aware that to the east of Sudya there are enormous mountains, and if you look to the extremity of Assam, you will see that it is proposed to carry a canal to the east of Assam, and then down the Irrawaddy; are you aware that between the Burhampootra and the Irrawaddy there are enormous and unexplored mountains?—So I understand.

Chairman.

1478. The cost of making a navigable canal is here estimated at 3,000*l.* a mile, under the most favourable circumstances; could you make a navigable canal at that rate?—It would depend entirely upon the nature of the country through which it was carried. For the High Level Canal, as it was called, which was to connect the present Orissa works with the Hooghly near Calcutta, the estimate was over 3,000*l.* a mile.

1479. That was a cheap canal, was it not?—No, it was a canal of full size.

1480. But the country through which it passed was flat?—There was a considerable quantity of drainage to be passed on the way.

1481. But an ascent or a descent of a few feet would enormously increase the cost of the canal, on account of the expense of the locks?—The lockage is one of the items of expenditure in a navigable canal.

1482. But the more level the country is through which the canal passes, of course the less will be the expense for locks?—Yes.

1483. And the greater the ascent and descent of the canal, the larger will be the expense connected with the locks?—Yes.

1484. Colonel Rundall, in the minute to which I have referred, recommends the combination of navigation with irrigation; do you agree with his suggestion?—Yes, wherever practicable.

1485. But the Indian Government in commenting upon this proposal, remark on page 17 of that return in paragraph 13, "The Government of India is quite sensible of the advantages in many cases of combining navigation with irrigation, and the consideration of the subject should never be omitted in preparing and submitting irrigation projects. But economy in the construction of irrigation canals is an object of such paramount importance that all other considerations must give way to it, and in this view navigation can only be afforded when there is an assured prospect of a return for the outlay, or when the extra expense of supplying facilities for navigation is comparatively small;" unless therefore the Indian Government are prepared to incur an enormous annual outlay, it is quite impossible for them to carry on their present irrigation schemes, and make the canals navigable?—We have not data in India itself to decide upon what the returns would be from a navigation canal. On the Godavery where navigation was introduced, the direct return from the navigation is comparatively very small, and it is obtained by charging the boats for annual licenses, which licenses pass them either through the Godavery canals or the Kistna Canal, but the return from this source is very small, because the works themselves pay so largely from the irrigation that it was considered advisable to make the communication as cheap as possible. On the Ganges Canal navigation has been carried out to a certain extent, but there were defects in the canal which have prevented any large amount of navigation having been developed up to the present time.

Chairman—continued.

1486. Colonel Chesney remarks in this very book upon some of those proposals in the following way; he says at page 227, that "The Kistna and Godavery deltas are still more favourable for such works, but because the Nile affords good navigation in Egypt, it does not follow that the same river will fulfil those functions in Abyssinia. Under certain favourable conditions as where a backwater can be created along the level of the coast without locks, or in the case of the deep tidal creeks of the Gangetic delta, a great navigation can be profitably conducted, because there is little or no expenditure involved to create it. Just so is the navigation of the ocean cheap and profitable." And he then goes on to comment in rather strong terms upon Sir Arthur Cotton's proposals; would you agree with what he says there as to its being necessary that the conditions should be favourable for navigation before navigable canals can be profitable?—As I said before, whenever it could be combined with the irrigation channels, I would carry it out, and I would make all the canals navigable.

1487. But in the case of all the canals that have been constructed by the Indian Government, with the single exception of the three in the Madras delta, the returns are very small from navigation?—And even there in the Godavery and Kistna district, the returns from the navigation are very small.

Sir *George Campbell.*

1488. Are you not aware that perhaps the most paying or the least unpaying part of the Orissa and Midnapore canals is navigation; that the navigation returns are comparatively considerable in those canals?—Yes. No doubt as those canals are perfected those navigation returns will increase very largely.

1489. Do you not think that there has been some, I will not say neglect, but that with our present experience more might have been done to render the canals navigable than has hitherto been done?—I think the necessity for making them navigable has only appeared of late years. When the canals in that part of India were commenced it was simply as irrigation works, and although it might happen that they might be useful for navigation, yet that was not the main object in making the work. In all the new works in Northern India navigation has been provided for. On the Sirhind Canal which runs partly through Native States there will be navigable communication; on the improvements to the Western Jumna Canal being completed, the whole

Colonel *Crofton*, R.E.

9 May 1878.

Sir *George Campbell*—continued.

whole of the new line will be navigable. It meets the Agra Canal below Delhi, and so makes a portion of a through communication with the seaboard. The remaining links that are required are comparatively small in number.

Chairman.

1490. It is quite clear, however, from the figures to which I drew your attention at the commencement of your examination, that unless the Indian Government are prepared to annually put aside a far larger sum to make up for the loss upon remunerative works, they will not be able to execute or carry out any of those great schemes of constructing navigable canals all over India, combining at the same time irrigation?—I think each scheme must be judged of by itself. I do not see how we are to decide for the whole of India. If each scheme is taken up and if it be possible to have navigation without any very large addition to the expense, then it would certainly be profitable to make the canals navigable.

1491. Therefore, of course, it would mainly depend as you admit upon the expense?—Partly so.

1492. As regards the establishment of the Public Works Department, do you think that they are rather over officered now or not?—When I left India there was a surplus of officers in the department, due mainly to the contraction of the sphere of public works operations.

1493. Since when has the contraction taken place?—The contraction has been going on since I became Inspector General of Irrigation; that is since 1874, and for some time previous.

1494. And the establishment's annual indents from England were made upon the assumption that the expenditure which was sanctioned in 1874 would be continued?—That I am not aware of. I cannot answer that question.

1495. But it must be upon some such estimate that the officers have been sent out, or else there would not be this surplus of which you speak?—When the expenditure was going on at a certain rate there were a great number of officers in the country, and when that expenditure was contracted, naturally there were more officers than were required to supervise the diminished expenditure.

1496. But the contraction has only amounted to a few hundred thousand pounds?—There were large schemes which were stopped at the time; there were surveys going on for new works in the Punjab which occupied several officers; there were new projects being got up in the North West which required a number of officers; the large Sardah Canal in Oudh which was deferred required a number of officers; then again in Bombay there were large projects which were deferred; a large one in Sindh, the Rohree, and Hydrabad Canal and others; those were some of the projects that were stopped.

1497. Have you come in contact with any officers who have been sent out from Cooper's Hill?—Yes; the first officer that was sent out was sent up under me; the next six were sent up under me, and there have been a good many of them since.

1498. Do you endorse the favourable opinion which Lord Northbrook expressed?—Yes, certainly. I have seen them in the Punjab, in the North West, in Bengal, and in Madras.

Sir *George Campbell.*

1499. Do I understand you that the whole of the Public Works Department was over-officered when you left India, or only the irrigation branch?—The whole.

Chairman.

1500. As regards native employment, I believe you are in favour of utilising the natives as much as possible?—As far as possible. For myself I should never employ a European when I could find a native to do the work. In the case of new canals, as soon as the canal was opened and irrigation commenced, we began to reduce the European establishment, and the only Europeans that were kept were the officers to supervise generally; and, as less people were required for construction, the subordinate Europeans were dispensed with, except two or three who were required on the more difficult parts of the work; on all the rest natives were employed. There are certain works connected with canals in which it has always been found advisable to employ Europeans. On the old canals in the North-West, the Western Jumna and the Eastern Jumna, and the Ganges, where there are no permanent head works, where the water is diverted into the canal by temporary works which are generally carried away by the floods, and reconstructed at the end of the rainy season, we always find it absolutely necessary to employ Europeans in charge of working parties. I have tried natives myself on them, and was obliged to revert to Europeans. When energy was required and power of organisation, I have generally found that Europeans were required.

1501. Do you think you get the right class of natives out of those training colleges for Public Works purposes of the higher class?—The only men of the higher class that I have met with were natives of Lower Bengal, but some of those who had been sent up to us in Northern India were utterly unfit to work there from the climate: so that almost in every case we were obliged to have them transferred; but what I have found them deficient in is energy and power of organisation. I believe that if we could induce the men of North India, and especially from the frontier, to enter our service, we might meet with men that would have sufficient energy for the work. I have tried myself to induce one or two chiefs belonging to the Punjab border to send their sons to be educated, but they have not yet come to see the advantage of that education.

1502. Then you would be in favour of utilising as much as possible native agency?—Certainly, wherever a fit man could be found.

1503. And it would be, therefore, necessary to keep a very careful watch over the annual indents which are made for engineer officers sent out from England?—I do not think that we shall be able for many years to come to do without European agency very nearly to the same amount as we have it now.

1504. But still if the department generally is over-officered, and you would wish to fully utilise native agency, it is clear that there ought to be some little reduction in the annual amount of officers that are sent out?—I look upon it as a temporary glut of officers.

1505. Of course, as each year fresh capital is applied to the construction of works, the establishments annually increase?—Yes.

1506. But

Chairman—continued.

1506. But they are at present so much in excess of what is required that it is not probable that the amount of capital applied for some years to come will give them sufficient work to do?—At present there are more officers than are required for the purposes of the department.

1507. Therefore you would agree, I suppose, in my suggestion, that care should be taken not to overstock the Public Works Department, or to send those highly educated young officers out who have nothing to do in the first few years that they are in India?—Certainly, the number of officers that are sent out should only be up to the requirements.

Sir *George Campbell.*

1508. Is it not the case that at present in the Public Works Department there are a very large number of officers of what I may call second-rate qualifications, whom it may be desirable to replace as soon as conveniently may be by the more highly educated class of officers who come from Cooper's Hill?—The men vary in qualifications.

1509. The Public Works Department at present is rather a miscellaneous establishment, is it not?—Yes; there are some men above others in ability and in power of work, and therefore, of course, it would be advisable to replace some by better men, but the difficulty is that they have entered the Government service under certain conditions, and it would be impossible, I may say, to turn them adrift without some very cogent reason.

1510. Is it not the fact that there are a very large number of officers now in the department who had not a regular engineering origin?—I do not think I quite understand what you consider an engineering origin.

1511. I mean a man who was educated from his youth as an engineer?—The number of persons of that description that are now in the department, so far as I know, are but few, comparatively.

Chairman.

1512. I understand from your evidence that you generally agree with General Dickens, that the construction of irrigation works should be continued; that great care should be exercised before schemes are sanctioned, as when once sanctioned it is very difficult to stop the expenditure; but that you would not wish to annually spend such a sum as would place a greater charge for public works than is at present borne by the revenues of India?—I think that would be a question rather for the financial officers to reply to; so far as my own view is concerned, it would be to develope the works, as I said before, at such a rate, that the wage-rate should not be interfered with in the country, so that the works should not be abnormally expensive; wherever irrigation works are extended in the country, so far will there be, not an immunity, for that can never be, but a mitigation of famines, and they will do so in two ways; first, they will mitigate them directly by supplying that, the want of which causes famine, namely, water, in the very year when it is required; and next, even in ordinary years they add to the wealth of the country, and enable the people better in years of famine to feed themselves.

1513. And the great difficulty of adequately protecting the country from famine will no doubt occur in Madras, where you have not rivers whose sources are permanent, and where from the poverty of the people it is not likely that any large irrigation works will be immediately remunerative?—I could not answer that question whether they would not be immediately remunerative; each locality must be judged of according to its own circumstances; it is true that they have not yet taken up the water on the Madras Company's works, which you may say is in a part of the country new to irrigation, but there are other parts of Madras which are covered with irrigation works; Mysore is simply one sheet of irrigation works; the last return for the province of Mysore gave a register of upwards of 37,000 tanks.

1514. But there was a famine in Mysore, was there not?—Yes, but the effect of the work there was to enrich the country to a certain extent; if they had not those tanks they would not be as wealthy as they are.

1515. But the tanks you admit are not sufficient to protect the country from famine?—Quite so.

1516. I am speaking of works which would protect the country against drought by being connected with rivers whose source of supply was permanent; such works could not be undertaken in Madras except at very great expenditure?—As I understand it, they are works which act directly upon a famine, that is, the supply of water in a famine year. I say this committee, which is sitting in India, would be able to get better details than we can give here of what was the actual state of things during the famine, which was the longest on record, and whether the works, either canals or tanks, supplied water, and to what extent, during the famine.

1517. Then as regards that part of India with which you are best acquainted, namely, the Presidency of Bengal, you think that that expenditure which is now sanctioned should be continued, and the public works should be prosecuted at much the same rate as they have been done in the past?—If the money was forthcoming I would carry them out still further than they are at present; I should mention perhaps, to show the immense value of water in a country like Madras, that in Mysore a scheme came up to the Government of India about, I think, two years ago, in which the commissioner of the division gave his opinion as to the value of this work, which was a channel, as well as I recollect, of about 40 to 50 miles long from the river Cauvery, and it was an old native work which was to be improved at the expense of the finances of Mysore. He stated that near the head of the canal the land was selling at 50 *l.* an acre, about the centre of the canal it was selling at about 27 *l.* 10 *s.*, and towards the end of the canal where the supply was precarious it was not selling for more than about 7 *l.*

1518. Which would show that the natives appreciate the water?—Yes, it shows the enormous value of the water.

1519. And the immunity as far as it can be obtained from drought?—Yes, adding to the wealth of the country.

Sir *George Campbell.*

1520. I understand you to say that so far as you

Colonel *Crofton*, R.E.

9 May 1878.

Sir *George Campbell*—continued.

you know the clause in Act VIII. of 1873, empowering the Government to impose a compulsory owners' irrigation rate, has not yet been put in force?—So far as I know.

1521. Then I understand that there is in the Punjab what is called a water advantage rate; I would ask you to be good enough to explain to us what that is?—The water advantage rate is the increase in the revenue, which is considered to be the Government share of the increased profits from the irrigation, and it is charged upon the actual irrigation, in addition to the direct water rate.

1522. But was that water advantage rate imposed at the time of the settlement or subsequent to the settlement?—It was assessed at the time of the settlement.

1523. Then, practically, it comes to this, that at the time of the settlement the settlement officer attributed a certain part of the land revenue to the ordinary land revenue sources, and a certain part to the benefit of irrigation?—Except this, that the permanent assessment was fixed irrespective of the irrigation, and the water advantage rate was the sum over and above that which was chargeable for the advantage of the water.

1524. But imposed at the same time as a part of the settlement?—Assessed at the same time.

1525. Practically as part of the settlement?—But it is imposed at the time of the irrigation, that is to say, in the same demand statement in which the water rate for the village for the season is entered; in that same statement is entered the water advantage rate alongside.

1526. The liability having been imposed at the time of the settlement?—Yes.

1527. So that there could be no complaint of any breach of faith?—Yes.

1528. It was in practice merely a matter of agreement whether the sum was attributed to the Revenue Department or to the Irrigation Department?—Yes.

1529. You have yourself seen a good deal of the Madras works, I think you said the Godavery and the Kistna works, and so on; were you very much impressed with the advantages of those works?—Certainly.

1530. Is the cultivation by means of the irrigation of those works almost entirely of rice, or is there much besides rice?—It is mainly rice; but perhaps I should say, that one reason that struck me for the returns being so easily obtained in the case of the Kistna and the Godavery, is the proximity of the markets; they have the seaboard on one side, and they have the dry district of Hydrabad on the other, and all the produce which they do not consume themselves is taken off at once into those districts, and a second reason is, the cheap carriage that they have got by the canals.

1531. Then do you gather that on those canals they are able to raise rice year after year in the same fields without deterioration?—That I do not recollect hearing anything about.

1532. So far as you saw, the crops were fine crops, and you did not see symptoms of deterioration from over cropping?—I saw, I may say, sheets of sugarcane of a large kind, which had grown close to the seaboard, which was, they said, quite a new species of cultivation since the canal came in. The sugarcane which they grew in small quantities before, was a thin sugarcane, not thicker than a man's finger, but this sugarcane is of a very large kind, and the most of that sugar I was told at that time was consumed in the higher districts of Hydrabad and Mysore, and elsewhere.

1533. You are aware, are you not, that a great deal of manure is used in the cultivation of sugar?—Yes.

1534. From your experience, do you believe it is possible to raise large quantities of wheat year after year by irrigation, without also applying a great deal of manure?—I think that the land must be manured, or else it will deteriorate; but I should say that in all cases drainage must be combined with the irrigation, or the land will deteriorate, and that it has deteriorated on the Western Jumna Canal and elsewhere.

1535. It is a fact, is it not, that it has deteriorated?—No doubt whatever.

1536. And that the health of the population has been much affected?—It has been very much affected, and it is with the object of obviating those evils that a large expenditure is now going on on the canal.

1537. Have you seen much of the tank system of Madras?—In passing over the country I saw a good many of their tanks.

1538. Were you impressed with the belief that in ordinary years, when there was not extraordinary drought, it is a very successful system?—It seemed to me that the larger tanks, in fact, the large lakes, might hold water for two, or perhaps three, years' supply; but the smaller tanks by the reports which we have heard, for I have only the newspaper reports, were all dry.

1539. I mean in an ordinary year, when there is no extraordinary drought, were you impressed with the view that it was a very successful system?—Certainly; and the reason is that the water would have run off if it had not been for those tanks intersecting it.

1540. As regards the Department of Public Works you said it was your impression that but a small proportion of the officers that are now in the department have not been regularly educated as engineers; is it not the case that there is a large number of officers of the staff corps in the department who were not originally educated as engineers, and also a very large number of uncovenanted officers who were taken into the department and who have received such education as they have in the department, rather than having been educated as engineers before they entered the department?—I should have said in my reply that I referred to the uncovenanted officers, of whom there are comparatively a very small number now, so far as I am aware. Of the staff corps officers there are a considerable number, and but few of them have been educated as engineers from the beginning. Some have passed through the colleges in India, but comparatively few have had an engineering education except in those colleges.

Mr. *Hardcastle*.

1541. You stated that the quantity of culturable and cultivated land in the Punjab was 66,000 square miles; I understand you to mean by "culturable" land, land not already in culture, but capable of being made productive by increased irrigation works?—The total I have given (and it is from the totals given in the published

Mr. *Hardcastle*—continued.

lished statements) of actually cultivated and culturable land, that is the portion of the country which it is possible to cultivate. There may be large tracts which are either very sandy or hilly, or the areas of rivers, the areas of towns, and other portions which it is not possible to cultivate.

1542. Are irrigation works in progress or contemplated for rendering that culturable land productive?—There are a certain number of projects in the Punjab at present existing, and some are in progress which have not began to irrigate yet, and others have been projected; there are these three species of works.

1543. Looking at the very great productiveness of some of the irrigation works in the Punjab, is it your opinion that this culturable land could be brought into cultivation by means of irrigation with large returns of profit?—Eventually with a very large return, but in the parts of the country where the population is very sparse no doubt it would be some years before they would return what they may be expected to do.

1544. If the land were rendered productive, would not the population rapidly accumulate?—That we have no facts to show. There are differences of opinion with regard to that, and as to the rate at which the population would increase, but no doubt the population would come.

1545. Would it be probable that there would be immigration from other parts of India into the land which is culturable, or would national differences prevent anything of the sort?—I suppose that the ordinary laws of increase would hold good there, that where the means of supply existed there the population would increase.

1546. And besides the natural birth-rate, would there probably be a considerable increase by immigration if the land were rendered productive by irrigation?—In the case of one of the projects in the Punjab, I speak of one just at the very most northerly point, in the Valley of Peshawur that project was put in hand, and one of its main objects was to induce some Hill tribes beyond the border to come down and cultivate in the British territories, because it has been known lower down along that frontier, that people belonging to the Hill tribes have become cultivators in canal districts on the British side of the border.

1547. Has that intention been fulfilled?—It is a project which has only just commenced.

1548. You stated that the Cauvery Works at the time of the British occupation extended over 700,000 or 800,000 acres; have they been since extended, or do they remain as they were?—They are somewhat larger; I give the statement as it is given in the records, that the irrigation about the time of the British annexation was 700,000 acres, in Tanjore, I think it was; and in one of the later years, the irrigation was 793,000 acres.

1549. Is that in connection with the Cauvery Works?—Yes. When I say Tanjore, I mean what are called the Cauvery Works; and it is supposed that the Cauvery Works may rise to 1,150,000. The maximum irrigation of which we have a record, was in the year 1875-76, and it was 835,208 acres in that year.

1550. Is that the last year for which you have a return?—Yes; and it is estimated that it can rise to 1,150,000 acres.

Mr. *Hardcastle*—continued.

1551. Has it been increasing of late years pretty steadily?—I have not returns to show the increase year by year.

Sir *George Campbell.*

1552. Is it the fact that up to the present time the increase, as compared with the irrigation when we took possession of the country, is not very large?—According to these statements it is not very large; but it has been kept up; whereas it is stated that before the works were made the cultivation in the country was deteriorating, and it would have been much worse if it had not been for those works.

1553. It was in danger of being lost, and by means of our works it has been maintained?—Yes, it has been maintained.

Mr. *Hardcastle.*

1554. Could you say whether the state of cultivation of the 700,000 or 800,000 acres is better now than it was in the time of the British occupation?—No, I have not personal knowledge sufficient to say.

1555. With regard to the Orissa Scheme, you gave us three divisions, one the Orissa, another the Midnapore, and a third the tidal canal, being a total cost of about two-and-a-half millions; were those three divisions all included as part of the original scheme?—They were all portions of the original scheme which were to be connected together.

Mr. *Balfour.*

1556. I think you said that you saw two advantages in promoting irrigation works; the one a direct advantage in providing water in case of famine, and the second an indirect advantage consisting in increasing the wealth of the population?—Yes.

1557. Do I understand you to mean that that second or indirect advantage would take place in the case of works which did not pay?—Yes.

1558. Then you would recommend to a certain extent the undertaking of work which did not pay on the ground of that indirect advantage to the country?—Yes, if the revenue of the country could stand the strain.

1559. But of course the whole of the funds which go towards constructing those works are obtained from the country by taxation, and the fact that they do not pay when expended on irrigation works shows that somehow or other the country must be a loser; you may increase the wealth, in other words, of one particular district, but it must be at the expense of some other part of the country?—I suppose so; but those large works must be looked upon not alone as of local benefit and interest. The irrigated tracts are great granaries for the country, and in a time of famine in one part of the country those tracts are able to help that part of the country. For instance in this last famine in Madras a very large portion of the grain that went to feed the population came, as I am informed, from the canal irrigated districts of the north west, and the Punjab, so that they are of value to all the country similarly to railways.

1560. Now you are going back to the first or direct advantage, that of providing the actual food, but I want to know whether you think that the indirect advantage of increasing the wealth of the country is really such as to make it worth

Colonel *Crofton*, R.E.

9 May 1878.

Mr. *Balfour*—continued.

while spending money upon work which cannot be expected to pay?—I should not recommend any work to be carried out unless there was a prospect of its indirectly paying.

Mr. *John Cross.*

1561. At the beginning of your evidence you stated that the Government revenue could not be increased during the time of the Land Settlement, except afterwards by supplemental taxation imposed on the landowner on account of irrigation?—Yes.

1562. Has any estimate been made, or have you formed any estimate from your own knowledge of what advantage would accrue to the landowner or to the cultivator over and above the amount which he would have to pay in the increased land rent, or increased taxation which is imposed upon him for irrigation purposes?—A landowner would be able to increase his rent if land was irrigated which was formerly not irrigated.

1563. I should like you to give us an estimate of the amount of advantage which would accrue to him, or to the cultivator over and above what accrues to the Government?—The Government would only take a share of the increased profits, which were generally, I think, and are generally all over India, estimated at one-half assets. There is a certain increase over the revenue which would be on irrigated land, and a certain increase in the value of the crop; and one-half of that would be taken.

1564. Then you would say as a general rule, that the cultivator or the landowner would gain as much by irrigation as the Government gained by irrigation, so that the advantage to the country would be really double what it appeared to be?—Certainly, double.

1565. And I think you said that the Orissa works were planned on a grand scale, and consequently were very expensive, but that those works have been altered in design and reduced in extent; would you tell us what acreage those works were originally intended to irrigate, and what acreage they do irrigate?—I would say first, that the design was not altered, that the portions of the works that are constructed were constructed on the original design; but as the original design was one of far greater extent than the one which has been carried out, some portions of the works which had been already constructed were too large and too expensive for their present purpose.

1566. In fact, it was like laying the foundation of a very large building, and only completing a portion of the building?—Quite so.

1567. Can you give us any estimate of the acreage which it was intended should be irrigated, and the acreage now irrigated?—The first estimate that was given in after the works were taken over by the Government of India was in the year 1871, and the acreage then estimated was 1,607,000 acres; the acreage irrigable now is estimated to be 376,172 acres.

1568. About one-fifth of the contemplated area?—Yes, of the total; but I should say that the distributories for the whole of the area which could be irrigated from the canal have not been constructed, as it was deemed advisable by the Government to wait till it could be seen how far the people would take the water, and that each new set of distributories should be made when it could be seen that they would be profitable.

Mr. *John Cross*—continued.

1569. May not the fact of those distributories not being constructed have something to do with the small quantity of water which is taken, and would not that state of things extend to districts which require irrigation in all probability more than they do in the immediate vicinity of the canal?—The acreage that has been taken up up to the present date has been small, even in proportion to the small acreage that I have given.

Mr. *Sampson Lloyd.*

1570. In order to make this question of advantage derived by the Government from irrigation a little more clear, I think you said that the difference between the former rate and the recent rate of land revenue is only estimated, so far as the Government is concerned, in the direct result of irrigation; if that is so, is not the land revenue fixed by law permanently in some parts of India, namely, in Bengal, and in some other parts?—Yes, in parts of Bengal.

1571. What is the profit which the Government derives in revenue where that system prevails; is it any more than the actual direct revenue of the water-rate?—At present that is the only revenue that the Government could derive where there is a permanent settlement.

1572. You said something about power being given to the Government under the Act of 1873 to impose an owner's rate in districts where the revenue had been rendered permanent for a term of years; is there any power to impose an owner's rate in those districts where the land revenue is permanent, and where there is a permanent settlement?—Not that I am aware of.

1573. Still I presume from your answers to other questions, that although the direct gain to the Government may only be the actual water-rate, you consider the indirect advantages, which you have several times mentioned, as fully justifying, at all events, the reasonable extension of those works?—I consider the indirect revenue, as it is called, a portion of the price of the water which is taken in that shape as being most suitable to the people. In many parts of the country I believe that they would prefer to have the whole rate included in the land revenue instead of in a separate water-rate; and notably so in parts of the Punjab, where it is so. It is all land revenue from the inundation canals.

1574. Some questions were put to you in an earlier part of your examination to-day which cast great doubt on the practicability of introducing those irrigation works where there were ranges of hills; I want to ask whether, in your opinion, as a very experienced engineer, there is anything necessarily impossible in bringing a canal through a range of hills, of course at a certain cost?—I should think that every such scheme must be judged on its own merits.

1575. Is it not a fact that in this country the Leeds and Liverpool Canal, to take a familiar example, passes through ranges of hills not far short of 3,000 feet high; and there are other instances which might be named; therefore, assuming it to be desirable in other respects to have those canals, I want to know whether, in the abstract, the difficulty of passing ranges of hills is so extremely great as to make the whole scheme insuperable?—I should think that, in

passing

Mr. *Sampson Lloyd*—continued.

passing through ranges of hills, the cost might be prohibitory; otherwise a canal could be carried in most places.

1576. Are there not generally valleys between most ranges of hills through which a railway or a canal may be carried?—A railway may be constructed in many places where a canal could hardly be constructed.

Mr. *Onslow*.

1577. The proper definition of your office is Inspector General of Irrigation for India?—Yes.

1578. And you were appointed in 1874?—Yes.

1579. Were you the first appointed?—No, my predecessor was Colonel Rundall, who held the office for four years.

1580. Was Colonel Rundall the first who was appointed?—No, before him there was Colonel Anderson, of the Madras Engineers.

1581. His designation was the same as yours; he was Inspector General, was he not, for the whole of India?—Yes, and before him Colonel, now General, Strachey.

1582. Your duties, I presume, are with the Government of India, and wherever the Government of India goes you go?—Yes.

1583. A scheme is proposed, say by the Governor of Bombay, that scheme having been carefully gone into by his engineering officers, it is sent up to you, and all its bearings and the nature of the country specified, and the financial probabilities of success?—Yes, that is what is required.

1584. Is it your duty as Inspector General to go to every one of those places where a scheme has been propounded and inspect for yourself personally the nature of the ground before you advise the Government of India to sanction such scheme or not?—Where the information given is not sufficient, or where it seems to me advisable or necessary that I should see the place to form an opinion on it, then I should go to the locality and see for myself.

1585. Do you judge of that for yourself, or does the Viceroy give you instructions?—I have had instructions on one occasion when projects were recommended for the Province of Tirhoot, after the famine of 1873-74.

1586. Can you tell me, since you have held your present office, how many irrigation schemes have been sent up to the Government of India?—Very few new ones since I have been in office. The only ones that I can call to mind are those for Tirhoot and one or two smaller ones in the North West Provinces, and one in the Punjab, and two or three from Madras.

1587. How many of those districts have you visited before any outlay has been sanctioned?—In one case, the project from the Punjab, I had drawn it up myself when chief engineer of the irrigation in the Punjab, so that I was acquainted with the locality. In Tirhoot no projects have yet been sanctioned. In the North West, for the project that was sent up, I visited the locality myself two years ago.

1588. Do you, or do you not, think that it would be better on the whole, and more satisfactory to the Government of India and to the Government of this country, if you, as Inspector General of Irrigation, before any scheme was sanctioned, were to go personally and see whether

Mr. *Onslow*—continued.

that scheme would be likely to answer its expectations or not?—Where it is necessary, as I said before, to see the locality in order to pass an opinion upon it, then it certainly is advisable for me to go to the spot and see it.

1589. Then as Inspector General, you think there are certain schemes which you should not investigate personally yourself?—Which it may not be necessary for me to investigate.

1590. That is in your own discretion?—It may or may not be.

1591. Yours is a separate branch of the Public Works Department, is it not?—Yes.

1592. Before any official communication is made to the Viceroy of India in Council, do you correspond directly and take all papers up directly to the Viceroy, or are those papers sent into the Secretary of the Public Works Department?—All go up through the Secretary of the Public Works Department.

1593. So that before a scheme goes up to the Viceroy it goes first through the hands of the governor, or lieutenant governor, or commissioner of the province, then to you, and then from you to the Secretary of the Public Works Department, and then to the Viceroy?—In fact all schemes that come up come up to the Secretary of the Public Works Department.

1594. Are they not sent direct to you?—No. Each scheme then is sent to the head of the department with which it is concerned. Railway projects would be sent to the Railway Department, and irrigation projects would be sent to me.

1595. Then would it be forwarded to the Secretary of the Public Works Department, and not direct to you?—It is addressed to the Secretary.

1596. And does the Secretary, as a rule, as Secretary of the Public Works Department pass any comment before it comes to you?—Not usually.

1597. He does not think it incumbent upon him to stop a scheme, which he think not feasible, without sending it to you?—He can stop it after it has passed from me.

1598. He may stop it without going through the scheme, and without sending it on to you at all?—I have never known an instance of that.

1599. Are the engineer officers in charge of those particular works immediately under you, or under the Secretary of the Public Works Department?—As General Dickens explained in his evidence, since 1854 all the officers in the Irrigation Department have been under the local governments direct.

1600. Then, practically, you have no control, as Inspector General of Irrigation, over any officer in that department?—No control whatever, only in a case in which I may either ask leave, or I may be directed, to visit a certain work, and to give detailed orders, which would be more conveniently given on the spot than by letter; but as Inspector General of Irrigation, I have no power to give a single order.

1601. I may conclude, from your evidence, that your work, as Inspector General of Irrigation, is not so practical, but it is more office work, desk work?—Except the inspection of the works.

1602. Except the occasional inspection of the works?—Except the inspection of the works,

Colonel *Crofton*, R.E.

9 May 1878.

Mr. *Onslow*—continued.

which generally occupies from two to three months in the year.

1603. You do go round and inspect the works?—Yes, it is part of my duty. India is a large country. I go round and inspect as far as I can. I inspect the works in progress, and some old ones where there is anything of importance.

1604. As having had great practical experience in irrigation, have you seriously considered the subject of having a compulsory water-rate wherever irrigation canals have been made?—A compulsory water rate was proposed when I was chief engineer for the irrigation of the Punjab. At that time the canal officers, and I may say also the revenue officers, were unfavourable to it, so far as North India was concerned, on the grounds that the water would always be taken advantage of in North India in any irrigation scheme that might be put forth.

1605. That was then your own opinion?—Yes, that was my opinion.

1606. Having had since then more extended experience, that is still your opinion?—Yes, as regards Northern India.

1607. In other parts of India have you ever considered the propriety of having a compulsory water rate?—I have considered it for Bengal, whether it should be brought in there or not, and so far as my own opinion goes I think that it might very properly be put in force there; but there is another thing with reference to works in Bengal, or at least the Orissa works, that the benefits to the public there are not only the irrigation, but the defence of the country from floods, and for that the people do not, up to the present time, pay anything.

1608. Do you think, throughout the whole of India, if a compulsory water rate were determined on, that the rate should be uniform, or should it vary according to the particular requirements of the locality?—I think that all rates of the kind should vary with the particular requirements of the locality.

1609. I ask you this, because it has been suggested that the rate should be uniform; I daresay you are aware that such a suggestion has been made throughout India?—Yes; but I think it should vary with the locality.

1610. Have you ever gone carefully into Sir Arthur Cotton's schemes, if I may call them schemes, of irrigation for the whole of India?—No, they never come officially before me.

1611. Under any circumstances are you of opinion that the canals would ever come into competition with the railways, so as in any way to affect the receipts of the different railways in India?—I doubt whether they will ever come into competition, and for this reason, that unless there be very cheap carriage, there are large quantities of goods which will never be moved at all. If cheap carriage is brought in, there will be a great interchange of commodities. At the present time I derive it from the experience of other countries, just as the system of railways is but new in India, and we have to derive experience from other countries, and so may we derive it with regard to water from other countries. In France, at present, they are developing their water ways to a very large extent, although they have a network of railways. In America the same thing is going on, and I do not see any reason why the same thing should not hold good in India.

Mr. *Onslow*—continued.

1612. So far as the prejudices of the natives are concerned, do you think they would prefer one mode of transit to the other?—That is a question I could hardly answer, but they have taken to the water carriage wherever it has been brought in, and to show how they take to it as the mode of travelling in the Kistna and the Godavery, there are three lines of canals, which I may describe as three sides of a rectangle, one line coming from the hilly country to port of Masulipatam, another line coming from the head of that along the foot of the hills to the Godavery, just above the great weir on that river; another line of canal runs from that point to the port of Cocanada. There is a regular daily passenger service along this line. When I was there there were six boats each way daily. They worked it this way; one set of boats carried them up from Masulipatam to the Kistna weir, while another set of boats carried them half-way to the Godavery, and another set took them up there and carried them to the Godavery weir, and then a fourth set of boats carried them to Cocanada. When the navigation was first started, or rather when the canal was first opened for navigation, no one would take up the business of the boat traffic; there was a company formed, on which, I am told, there were one or two Europeans, and they began to make such large profits (some said about 15 to 20 per cent.) that others immediately started up, and when their returns diminished, the company broke up. Now the whole traffic is in private native hands, and they told me when I was there that the boats have been increasing in size and numbers every year. I believe from five tons they have gone up, on the Godavery, to as much as 20 tons.

1613. What class of boats are they; are they propelled by steam?—No; steam has not been employed as yet on the Godavery. There are steamers belonging to the Government, but the Government has never taken up the carrying trade on the canal.

1614. Are the boats dragged by horses?—No, by men; on some of them they are propelled by sails when there is wind, but the haulage is by men still.

1615. Those canals are also for the purpose of irrigation, are they not?—Yes, and the boats can get out into the tide water. The canals are locked into the tide water.

1616. The Government of India have lately laid down a very good proposition that no irrigation work is to be begun unless it is supposed to be remunerative, but has it not always been the case that wherever an irrigation work has been sent up from the different local governments it has been considered to be remunerative?—I think that was so, but the schemes were never examined so carefully as they have been of later years. When the Western Jumna Canal was first started, in 1817, there was not much reference to direct payment, as the extract which I read from Colonel Colvin's report showed. A rate was put on which was only to prevent waste; but of later years, especially since borrowed money has come into use on those works, the examination of the projects is very much more careful than it had been before.

1617. By the examination of those projects being now more careful, do I understand you to mean more careful in two ways; first, by the

Government

Mr. *Onslow*—continued.

Colonel *Crofton*, R.E.

9 May 1878.

Government who initiates them, and secondly, by the Supreme Government which sanctions them?—The examination of the Supreme Government necessitates the minor government looking at the scheme before it comes up, because several times we have had to send projects back, or defer them and hold them in abeyance for want of information.

1618. Your remark applies, does it not, to both the local government and to the Supreme Government as regards the more careful investigation of those works?—Yes, the examination is just as particular whether it is Government money or contributions. One of the schemes I should have mentioned, perhaps, in Northern India, is constructed partly by British money and partly by native states; I refer to the Sirhind Canal. That canal was estimated to cost 3,087,000 *l.*, and of that the native states will pay 1,172,760 *l.*

1619. Might I ask what those native states include?—Independent native states. There are three states which are concerned with our Government there; Puttiala, Jheend, and Nabha. When this canal is completed, the main channels will be kept under the control of the British Government, because it was found that the native states of themselves represented that there would probably be disputes about the management if they took it themselves. Then distributory channels are to be made especially for each state, and they are to have the sole and exclusive right to the management of them, they paying every year their share of the annual expenditure.

1620. And that you consider to be a very wholesome state of affairs, where you find native rajahs and the English Government working hand in hand for such a good object as irrigation?—The most wholesome condition that could possibly be.

1621. Do you think that by the encouragement of other native rajahs in India, such a state of things could exist elsewhere?—There may be others, but at present I am not cognisant of any other cases. The origin of this was that the chief of Puttiala, about the year 1860, applied to Lord Canning, then Governor General of India, to lend him British officers to work out a scheme to bring the water down the Puttiala territory. It had been tried before, in the year 1840, but the expense put it out of the question then; and he knew that his country would be so much benefited by irrigation that he said he was willing to pay any reasonable amount for the canal. The project was drawn out first in the year 1862, but he died in November of that year, and it then fell into abeyance until it was determined to spend borrowed money upon works. It was then started, and it is now approaching completion. Then there will be a navigable communication along all the main lines from the Sutlej to within 50 miles of the Jumna river. The connection between the channels of the Sirhind Canal and the Jumna canals, a distance of 55 miles, has been deferred for the present. That communication will be continued by the Western Jumna Canal, as it is being remodelled now to Delhi. A short link would carry it on into the Ganges Canal, and that would bring on the water communication nearly to Allahabad.

Mr. *Onslow*—continued.

1622. Are you aware whether the annual payments of those three rajahs come out of the revenues of their districts, or do they borrow money to pay their share?—Out of the revenues of their districts.

1623. During your time has the Viceroy ever communicated with any rajah to induce him to work with us for such an object as the irrigation of his country and the country contiguous to him?—Not that I am aware of. After the famine of 1873-74, the Viceroy wrote, asking the local governments if it was not possible to induce the people of the country to subscribe capital for the construction of irrigation works in Tir hoot.

1624. Do you think I am jumping at an unfair conclusion when I say that it would be probable that if the Viceroy, through his secretary, communicated with some of those rajahs in India they would be unwilling to assist in carrying out an irrigation project?—I could not answer that question. As I said, the origination of this canal was with the Maharajah of Puttiala, but the channels pass through Jheend and the Nabha territory; and at first the whole of what were called the native branches on that canal were to have belonged to Puttiala, but before the agreement which was drawn out was actually signed it came to the knowledge of the Government that Jheend and Nabha would not have anything to do with Puttiala in the matter of irrigation. In fact, so much averse were they to taking water from Puttiala that they said they would rather the canal was not made at all than that Puttiala should have anything to do with it. On that the Government said, Well we will manage it so that you may be shareholders, as it passes through a large portion of your territory. The proportions of their shares will show you the interest that each had in it. Of the total that I gave, 1,172,760 *l.*, Puttiala pays 1,010,451 *l.*, Jheend pays 53,453 *l.*, and Nabha pays 108,855 *l.*, so that their shares are comparatively small when compared with Puttiala.

1625. And it is laid down in the agreement that they are to share in whatever profit there may be *pro ratâ*?—Yes.

1626. Will you kindly put in a statement of the agreement and the circumstances connected with the construction of that canal?—Yes, I will hand it in.

1627. Is it the case now that the staff corps officers educated at Roorkee get engineering appointments under the Irrigation Department?—Yes.

1628. Besides those from Cooper's Hill?—Yes.

1629. And do you think that that system works well; do you get as good a class of officers now from Roorkee as you do from Cooper's Hill?—Some of the very best officers that I ever had under me have been those in the staff corps educated at Roorkee.

Sir *George Campbell.*

1630. Do I understand you that the staff corps officers are now sent to Roorkee to be educated, and then drafted into the Public Works Department; that is to say, young officers going from this country now joining the staff corps, are sent to Roorkee?—Until I left India there

Colonel *Crofton*, R.E. 9 May 1878.

Sir *George Campbell*—continued.

there were officers at Roorkee; I do not know more than that.

1631. Young officers sent to be educated at Roorkee?—To receive the usual education at Roorkee.

1632. As the staff corps or officers of the Engineering Department?—I speak under correction, but I believe that of late the staff corps officers going to Roorkee, either has been stopped altogether, or very few go to Roorkee to the Engineering Department.

1633. We know that the old officers of the Indian army who had been trained on the staff corps, having no other employment, were employed in the Engineering Department, but I want to make it quite clear whether the modern staff corps is now supplied by young officers from the army, and is still the nursery to the Public Works Department; you do not seem to be quite clear about that?—I cannot say within the last two years, but before that it was so; there were officers sent out.

Mr. *Onslow*.

1634. If any change of that importance had been made, you probably would have been aware of it?—I personally might not have been aware of it.

Mr. *Fawcett*.

1635. Have any complaints been brought under your notice, that after irrigation has been in operation for some time, it greatly diminishes the fertility of the land in certain parts of India by causing an efflorescence which I believe is known as "reh"?—Yes, I have seen "reh" in many instances, but I have also seen it in places where there was no artificial irrigation at all.

1636. But is it the fact that that is the case on land which has been irrigated where it did not appear before the land was irrigated?—Yes, where the drainage was defective.

1637. And it is more general in irrigated land than in unirrigated land; it may be considered in fact as an unfortunate concomitant in certain cases of irrigation?—It is not a necessary concomitant of irrigation.

1638. But still as irrigation works have been carried out in India hitherto, it has been in several parts a result of irrigation?—It has been so.

1639. Have also complaints been brought under your notice that in certain districts where irrigation work has been carried out, it has not only caused the physical deterioration of land, but the physical deterioration of the people?—So I have heard it stated, and I believe it to be the case.

1640. You mentioned that since the plan of Extraordinary Public Works was commenced, which was in 1868, that is to say, of classifying them as Extraordinary Public Works, no irrigation work has been undertaken unless it was supposed beforehand it was likely to prove remunerative; you mean by that, I presume, that it would return the market rate of interest upon capital expended?—Yes.

1641-2. Have you ever formed any estimate of in how many instances these predictions about the remunerative character of these works have been falsified, and the number of instances in which they have been verified; the instances in

Mr. *Fawcett*—continued.

which they have turned out to be incorrect have greatly exceeded, have they not, the number of those in which they have turned out to be correct?—I should have to go over all the projects to compare the numbers before I could answer that question.

1643. Your general knowledge would lead, would it not, to the conclusion, that of the irrigation works that have been undertaken since 1868, very few of them indeed have been remunerative?—They had not been up to date, nor was it possible that they could be.

1644. Then are we to understand that it is impossible for an irrigation work to be remunerative in 10 years from the commencement of its construction?—I could not lay down the number of years.

1645. This classification commenced in 1868, that is 10 years ago, and some works were immediately begun to be constructed; after that classification was adopted, I am to understand that out of those remunerative works which were expected to be remunerative at the expiration of 10 years, not one of them can be shown to be remunerative?—For the full development of a large irrigation work, I should consider that 10 years was not sufficient.

1646. Then looking upon it as a financial question, even with a remunerative public work, you have got to start with the expectation that for 10 years at least, even if it ultimately proves remunerative, it will not be remunerative?—For some years, certainly; I could not lay down a limit.

1647. Would you say 10 years?—I could not say 10 years, nor anything as a minimum, but for some years it must be so.

1648. But in those cases where you have fixed 10 years, it may be longer but it cannot be less, as none of those which were undertaken in 1868 have become remunerative so far as our facts go up to the present time; 10 years is, as it were, the inferior limit, and may be a superior limit?—Ten may be taken in that sense, but I could not lay down any rule.

1649. The number of engineer students that come out from Cooper's Hill each year does not vary with the amount that is going to be expended on Public Works in India, but it is fixed, is it not?—I could not answer that question exactly.

1650. How many native engineer students are there at Roorkee?—That question I cannot answer.

1651. There are very few, are there not?—The number is not large.

1652. Not a dozen, are there?—I could not say.

1653. But the number is very small compared with Cooper's Hill?—Yes, certainly, compared with Cooper's Hill.

1654. As a fixed number come out from Cooper's Hill each year, the first call upon the Public Works Department is to find work for those young engineers that come out from Cooper's Hill?—I suppose it is considered so.

1655. If that supply from Cooper's Hill is sufficient, or is more than necessary at the present time, to superintend the engineering works of the Public Works Department, there is really a very inadequate chance of a student, however distinguished in examination he may pass, who has

Mr. *Fawcett*—continued.

has been educated in Roorkee, of obtaining employment?—I should think that any native who came up to the test of what we require in the Public Works Department, would never fail of getting employment.

1656. If those young engineers have to be paid who come out from Cooper's Hill, and are in receipt of a salary from the time of their leaving England, they would get the first chance of employment, and therefore a Roorkee student might have to wait longer, although he might ultimately secure it?—As I said before, I think that any native who came out of Roorkee with the qualifications which we require, would never fail of getting employment.

1657. You mean sooner or later, because complaints have been made, have they not, that owing to what may be described as the surplus of unemployed engineering talent in the Public Works Department, natives often have to wait a considerable time, and of the few who have been educated at Roorkee lately, those will have a long time to wait?—In my own experience I have found very few of them who are fit for our work.

Mr. *Fawcett*—continued.

1658. But you cannot answer definitely the question as to the length of time which they have to wait after proving themselves qualified for employment, compared with the length of time that the Cooper's Hill students have to wait?—Their qualifications can only be judged of at Roorkee, so far I may say as their book learning goes, but the other qualifications, that are at least as necessary, cannot be decided until they are on work.

1659. What I want to get at is this, does not a Cooper's Hill student have an opportunity of getting employment on works sooner than a Roorkee student?—He would have.

Colonel *Crofton*, R.E.

9 May 1878.

Thursday, 16*th May* 1878.

MEMBERS PRESENT:

Mr. Agnew.
Mr. Ashbury.
Sir George Campbell.
Mr. Childers.
Mr. John Cross.
Mr. Fawcett.
Lord George Hamilton.
Mr. Hardcastle.
Mr. Sampson Lloyd.
Sir Joseph M'Kenna.
Mr. Onslow.
Mr. Pease.
Mr. Edward Stanhope.

LORD GEORGE HAMILTON, IN THE CHAIR.

Sir GEORGE CAMPBELL, K.C.S.I. (a Member of the Committee); further Examined.

Sir *G. Campbell*, M.P., K.C.S.I.
16 May 1878.

Chairman.

1660. ON the last occasion when you were examined you were good enough to give the Committee your opinion as regards those public works which had not been expressly constructed for the prevention of famine, perhaps, now, you will be so kind as to state your personal experience of those works which were expressly designed for the prevention of famine?—The largest and most important class of works for the prevention of famine being irrigation works, it would be most convenient that I should first go over my experience with regard to irrigation works; and the first point in connection with that subject which I should like to submit is this, which results from my very earliest experience, in fact, all my experience during my residence and service in India, viz., that the accusations which have been sometimes brought against the natives that through ignorance and prejudice they will not take that supply of water, which is really beneficial to them when it is offered to them, are really quite unfounded. It seems to me that no man can have any experience of India, and scarcely any man can pass through India as a traveller, except when heavy rain is actually falling, without seeing that the natives have expended an immense amount of mechanical contrivance, and do continually expend an immense amount of labour in obtaining for themselves an artificial supply of water for their cultivation. In fact, in the drier countries of India, I have always found that they have an extreme avidity for a supply of water wherever they can get it under circumstances which really are beneficial to their crops. Not only have they expended much money and much labour on small works of the kind, but also in those drier countries to which I have alluded. I have become aware that under native administration the people themselves have attained to a very considerable organisation, whether in single communities, or as regards the joint action of several communities, in order to construct and to operate works of the kind. Of course under these circumstances, the avidity for water being great, quarrels between communities and individuals

Chairman—continued.

will frequently arise, and I may say that a large portion of the work of my early service consisted in adjusting and dealing with those quarrels and questions which naturally arose in consequence of the native avidity for water to which I have alluded. That being so, when enthusiastic engineers who think that there is nothing in the world as a remedy for all things like water, bring against the natives those accusations of prejudice and ignorance to which I have alluded, I would say there is only so much truth in those statements, that in India as in all parts of the world, it requires a little time to change the habits, to change the system of cultivation, and to change the crops which are grown under different conditions. But with that exception, it seems to me that those accusations of ignorance and prejudice are unfounded; that in reality the natives understand their own agriculture far better than we do, and far better than our engineering officers do; and that if those officers are in their enthusiasm led to make accusations of that kind, I would say first, do not believe them; and secondly, I would say to those officers themselves, you had better look at home; you may depend upon it that if the natives will not take your water there is something in regard either to the natural conditions or to the artificial conditions under which you have supplied that water, which probably gives the natives very good reasons for the ground which they take.

1661. But it is, I suppose, an undoubted fact, that in the case of certain of the irrigation works which have been made, the natives have not taken the water that was anticipated by those who constructed the works?—It is undoubtedly the case, that the natives have not taken the water that had been anticipated, and to some extent that may be due to that to which I have alluded, namely, the necessity for allowing time for the change in cultivation, in the habits, and in the crops; but for the rest, I think the answer which I have just given is true, *i.e.*, that when they perseveringly refuse water after a reasonable time, you must look to something else than their stupidity, and you will probably, if you search

far

Chairman—continued.

far enough and deep enough, find that there are good reasons for their unwillingness to take the water.

The first kind of irrigation of which I had a large experience in the earlier part of my service in Northern India, in the North Western Provinces, the Punjab, Oudh, and the whole of those great plains of the Upper Ganges and the Indus, is irrigation from wells. The Committee will see that those great plains are bounded by the high Himalaya mountains, and the physical conditions are such that the plains are everywhere underlain by a water-bearing stratum which can always be tapped by sinking wells. The depth of that stratum varies considerably. You may say that, as a general rule, the water is from 10 to 100 feet beneath the surface. In most parts of the country where well irrigation is very largely used, probably the water is generally from 15 to 50 feet below the surface, say 25 to 30 feet upon the average. The supply seems to be almost unfailing. It is derived from those perennial sources in the Himalayas, I suppose, which are not affected by one or two years drought; and in seasons of famine the wells seem to be just as productive of water as they are in the most rainy seasons.

1662. And those wells exist even in the drier climate of the Punjab?—They do very largely. A great part of the cultivation of the Punjab depends upon those wells. At the same time the construction of permanent masonry wells is expensive. Usually where the nature of the soil is such that masonry wells are required, the proportion of the land which can be watered from those wells is not very large. That is so in the drier parts of the country; in the Punjab, for instance.

Mr. *Onslow.*

1663. Were those wells that you are talking of made by the natives, or under British rule?—A very large proportion of them were made under native rule. It always has been the habit of the natives very much to encourage the construction of those wells. I have always found, in taking over territory from native States, that the revenue rules were such as very much to encourage the construction of the wells. For instance, in the Punjab and the small Sikh States, from which I have taken over new territory, I found that the rule of the division of the crops between the Government and the cultivator was this: that a much larger proportion was taken by Government from the land in which there was no wells, and a smaller proportion from the land irrigated by wells, for this reason: that in the latter case a much larger proportion of the produce was to be attributed to the expenditure of the labour and the capital of the ryot himself. It was commonly the case that from unirrigated land the Government took two-fifths of the produce, and from land irrigated by the labour and the capital of the cultivator, the proportion taken by the Government would be only one-fourth.

Chairman.

1664. In fact, the system of land revenue under the native States was that of giving a good percentage to those who chose to spend their money in making these masonry wells?—That was very much so where there was a division of crops; and I was also about to say that almost throughout India, in almost all the native States, there is a very common system by which a man who makes a well gets a certain small proportion of land near that well, rent-free and revenue-free; he is often compensated in that way.

Chairman—continued.

Sir *Joseph M'Kenna.*

1665. Is there any geographical or geological survey of the tract of which you speak, which would show where water was to be had, and at what depths, over any considerable tract?—The greater part of India has been subject to a geological survey, but those tracts where water is drawn from wells are so uniform that there is not much occasion for any scientific geological survey. What you have is the revenue survey, and in the revenue survey and the revenue records you will find in every village, I should think, pretty accurately stated, the distance of the water from the surface.

1666. As I understand you get the water in two strata, one in the stratum that is supplied from surface percolation, and the other that would produce a permanent supply by going lower down; are there any data open to us from geological surveys that would tell us that?—I think I may say broadly, as regards the whole of those great plains, that the water is not supplied from surface springs, but from deep geological water bearing strata.

1667. Do they produce artesian wells in any large degree?—I think artesian wells have been tried in some parts of the country, but not with success in any part of which I have any personal knowledge. We tried very hard in Calcutta to obtain water at different times, we sunk very deep, but we were not successful. I am not prepared to say anything with regard to the success of artesian wells, but I believe in some parts of India they have made a begining of them.

1668. Calcutta was not a very favourable place to look for an artesian source, was it?—No.

Chairman.

1669. In the Revenue regulations laid down by the British Government, has some favourable consideration been given to those who construct wells?—Our system is altogether different. In the early days of our rule we very much accepted the native idea that the construction of a well was not only an economically good work, but a morally good work. It is a sort of short cut to Heaven as it were in the eyes of the natives, to make a well for the benefit of their fellow creatures; and from economical grounds we very much encouraged the construction of wells, and it was our custom to make advances to the cultivators to construct the wells. In my earlier service I have often made such advances, but as our administration has progressed, as it has become larger, we have found it more and more difficult to undertake those minute operations, and instead of dealing with the individual cultivators, we have had recourse to a system of settlements for long periods of years, under which we settle the revenue once for all for 30 years, for better and for worse, and we allow the natives to make wells if they choose, and obtain a profit if they can. But the system of what is called tuccavee or offering advances for wells and such purposes, I think has now very much fallen into desuetude.

1670. Do you think that our system of land

Sir *G. Campbell*, M.P., K C.S.I.

16 May 1878.

Chairman—continued.

assessment at all restrain the construction of those masonry wells?—I hope not. I hope that the natives are now beginning to comprehend that at the end of the 30 years' settlement the revised settlement will be conducted on the principle that any increase of production due to the expenditure of the zemindars and the ryots themselves will not be taken into account in fixing the revenue. At the same time I should say that my experience, as a revenue officer, was mostly confined to the earlier settlements, and that I have not had personal experience of the settlements which were recently calculated at the end of the first term of 30 years, therefore I am not competent to state exactly how far due allowance was made for the capital expended by the natives themselves; but I have every reason to believe that the present settlements have been conducted on a very liberal principle, and that such allowance has been made.

If the Committee will allow me, I should like to describe the system of agriculture which is followed in those countries where this system of well irrigation which I have described prevails, say in parts of the Punjab, and the drier parts of the North Western Provinces. They have there the village system, which very much resembles the old Aryan or Anglo-Saxon village system which is described by Sir Henry Mayne in a work with which I daresay that many members of the Committee are acquainted. The system of agriculture is this, that the land belonging to the village is divided into three parts; you have the infield, the outfield, and the waste. The infield is the part of the land near the village, which is irrigated from wells and generally enclosed, and that portion of the village land is generally very highly cultivated, and the most valuable products, which require a great deal of water, are there grown and are irrigated from wells. In that part of the land you will generally see crops, I may instance wheat crops, quite as fine as any that you will see in England. On the other hand, what I call the outfield is that part of the village lands which is more distant, and which is not artificially irrigated from wells, and there they are dependent upon the rainfall, which in the parts of the country to which I have alluded is somewhat precarious, and the consequence is that you seldom get very heavy crops, that is to say, as a rule, you do not get very heavy crops. Perhaps in 10 years you have six or eight years of light crops; you have one or two years of bumper crops, and one or two years in which those crops almost entirely fail. I should also allude to a very important subject in connection with this system of agriculture, and it is the question of manure. We are not at all well supplied with manure in India. Unfortunately in those dry districts especially there is a great want of fuel; there is no coal, and there is not very much wood, and it has become necessary, and is the habit of the natives, to dry cow-dung, and to use it for fuel. The consequence is that that great natural source of manure is cut off, and artificial manure being absent, the supply is very moderate. The natives make the most that they can of that supply, and with the manure they have, they supply those fields which I have described as the infields, which are both irrigated and manured, and it is by the combination of irrigation and manure that they get those very fine crops. On the other hand, in the outfield, where such heavy crops are not produced, the soil being naturally fertile, and not being exhausted by too much cropping, suffices to produce crops with little or no manure, because the bad years act as a kind of natural fallow, and too much not being taken out of the land, the ryots are able to get on upon that land without manure.

Chairman—continued.

1671. You spoke of the want of fuel during the last few years. I believe the attention of the Indian Government has been directed to that point, and the Forest Department are doing what they can to remedy the evil by preserving what forests remain?—I think not; I do not think that the Forest Department have done anything which will be very effectual towards that end, except, I believe, in Madras. In Madras I understand that it has been discovered that there are some almost barren parts of the seashore which produce very luxuriantly some kinds of wood; I think Australian trees; and I believe there have been some very successful plantations in Madras. In the Punjab in the early days, when we had what were called non-regulation provinces, and when the district commissioner could make laws for his district, I made a law that every one who cut down a tree must plant five; but I am afraid that is not upon the Statute Book. The railways, too, have created a great demand for fuel, and I doubt very much whether the supply is increasing. The Forest Department has done very little in the way of planting.

1672. But they have stopped, have they not, the destruction of the forests?—To a certain extent they have, but it is impossible that the Forest Department should be allowed to interfere with the private lands. Where they have stopped the destruction of forests is in remote and jungly parts of the country, where there are no inhabitants and no crops almost.

1673. Will you go on to inform the Committee of your experience as to the different systems of cultivation?—As regards this question of wells, what I may call the normal system of cultivation, where those wells exist in the drier parts of the country, is somewhat supplemented when you get to the lower part, of what is known as the Doab of the North Western Provinces; in the Cawnpore district, and several other districts, you have, besides, the masonry wells, which I have just described, a system of what is called cutcha wells; that is to say, the soil is so firm that you can dig a temporary well without any masonry at all, and so much is this the case that in times of famine the people are able to sink temporary wells, and in that way to a considerable extent to supply the deficiencies of the season. At any rate, I think the statistics will show that in some of the lower districts of the Doab of the North Western Provinces to which I have alluded, a system of well irrigation was carried so far, that not only a certain proportion, but almost the larger proportion of the districts, or at all events of many villages, were irrigated by this artificial means from wells.

1674. In your opinion, is this a system of irrigation which could be depended upon in a year of drought?—There is no doubt, experience shows that it can be depended upon so far as it goes; that is to say, so far as the means of irrigation by those wells goes. If you could suppose the whole country to be covered with wells, and also

means

Chairman—continued.

means of feeding the bullocks to be provided, no doubt it would be sufficient; but still it is a system which involves great labour and great expense in raising the water; still there is one good result of that labour and expense, and that is that the water which the natives raise with so much labour is economised to the very last degree; there is not one single drop of it wasted; that well irrigation is a perfect model of careful cultivation. Every field is divided off into little squares, and every drop of water is carefully drained from one square to another, so that not one single drop of it is wasted. It was in countries under which the native system which I have described prevailed, that you have latterly introduced the artificial irrigation on a grand scale by means of the Ganges Canal and other modern canals. I should like the Committee to understand that it is a great mistake to suppose that this canal irrigation is solely and wholly a benefit to a country which was not supplied with water before. It is supplying a superior means of irrigation, by which, no doubt, an inferior means of irrigation was superseded; and therefore, in estimating the benefits of that superior system of irrigation, you must deduct, as it were, the benefits which had already been derived from the inferior system, which you have now wholly superseded; where canal irrigation is carried out to the full, you have, you may say, put an end to it. But it must be understood that, while in reference to the quantity of water great benefits are derived from this modern irrigation from canals upon the large scale, there are also very considerable disadvantages attending it. I have said that the natives, raising their own water with great labour, economise it very much; they raise it exactly at the time that they want it, and they make the very best use of it; but the water which is supplied from those large canals is supplied to them in a very much rougher manner, and they have not the same control over it, but they are obliged to take it when they can get it; the system is upon a large scale, something like the intermittent water supply of London, that is to say, the water is turned on to one district one month, and on to another district another month; into one sub-district one week, and into another sub-district another week; to one village one day, and to another village another day. The consequence is, that each native does not get the water exactly when he wants it, but is obliged to take it when he can get it, and very naturally, the view being that water is a very valuable thing; when they can get it they are rather apt to overdo it, and there is a great want of economy in their use of the water; when their turn comes they are apt to flood and almost over-flood their fields, and the irrigation is not of that very economical, careful, and beneficial character which the irrigation from their own wells is.

1675. This excessive use of water under a hot sun has a sterilising effect upon the soil, has it not?—It certainly is found to be so, and I think it stands to reason that it should be so; because it is undoubtedly the case that if to those fields which I have described as outfields, which hitherto have not had a full supply of water, and which depend upon the precarious supply of nature, you give an unlimited supply of water, no doubt for a few years you will get bumper crops; but I think every agriculturist knows, and probably every member of this Committee knows,

Chairman—continued.

Sir *G. Campbell*, M.P., K.C.S.I.

16 May 1878.

that no land in the world will stand high-cropping for a long series of years without manure, and therefore if your water stimulant, if I may so express it, is very largely increased without your supply of manure being increased, the probability is that you will exhaust your soil. I have described the difficulty that there is with regard to getting manure; the supply of manure is certainly very limited. You have not come in India to that form of high cultivation under which artificial manures are introduced for the purpose of manuring large fields, and I do not see where you are to get this very large supply of manure; the consequence is, that I am not at all surprised that very practical men who have had to deal with the subject tell us that in many of the districts, in the Doab of the North Western Provinces, in Cawnpore, and in other districts, after a few years increase of crop due to this system of irrigation, it has been found that the soil has been very much exhausted, and that very great harm has been done to it. Mr. Halsey, the Collector of Cawnpore, printed some statistics upon the subject, which seemed to show so strong a case that I thought it must be almost exaggerated, but I understand that the officers of the North Western Provinces who are specially charged with the department of agriculture, have recently stated that this exhaustion of the soil due to over stimulation by water, without manure, has now, under the Ganges Canal system, gone very far, and that great injuries have really been experienced.

1676. Have you read the report which has been made by Mr. Buck?—No, I have not had an opportunity of seeing it; I have only seen allusions to it, and abstracts from it in the newspaper.

1677. That report of Mr. Buck, who was the head of the Agricultural Department of the North West Provinces and Oude, was based upon a book written by Colonel Corbett; have you ever read that book?—No, I have not had an opportunity of seeing it.

Mr. *Fawcett.*

1678. Have you seen the paper of Colonel Fraser, of Bundlecund, pointing out the deteriorating effects of irrigation if continued for a long period, without the land being manured, and advocating deep ploughing?—No, I have not seen the paper alluded to, but I have seen a good many experiments in deep ploughing, and I have always found that they have been attended with most injurious results.

Sir *Joseph M'Kenna.*

1679. No doubt we find in home agriculture, that if you plough too deeply at first, the soil will not be fertilised by the new addition to it; but when the atmosphere acts upon it, and when the chemical ingredients of the soil are brought into play and under conditions to suit the agriculture, then the deep ploughing tells beneficially?—I do not think that that is so in India; I will explain it in another way; the soil is very deep indeed, frequently 10 or 20 feet deep, but everything depends upon keeping your supply of water in; if you break the crust of the soil, you let in the dry winds, and you dry up your soil, and you lose the full benefit of your water, and that is why I attribute injury to deep ploughing in a very dry country.

1680. There

Sir *G. Campbell*, M.P., K.C.S.I.

16 May 1878.

Sir *Joseph M'Kenna*—continued.

1680. There is no doubt that may be a reason, but that would be only an argument, I think, against their mode of culture, and not against the bringing up of new soil, but against leaving it in a loose and friable condition on the surface?—It always comes to this: that, in my opinion, the natives understand their own agriculture much better than we do, and when we try to impose these new fashions upon them, the result, in my experience, has always been disastrous; I cannot account for it beyond that.

Mr. *Onslow.*

1681. On the subject of manure, have any experiments been made with artificial manure that you are aware of?—There have been, on a very small scale, as regards the cultivation of opium by Government officers and such like; but I may say that for practical purposes the farmers have not yet tried artificial manure, that is to say, chemical manure, in India.

Chairman.

1682. I think I interrupted you at the point where you were describing to the Committee the reason why, under the present system of irrigation, the natives occasionally make an excessive use of the water; will you be good enough to continue your remarks upon that subject?—I mentioned that as one of the disadvantages of the system of canal irrigation, as distinguished from the old system of well-irrigation. I think I mentioned the exhaustion of the land for want of a corresponding increase of manure as another disadvantage; and then there is the great disadvantage, that is to say, the unhealthiness which has unhappily so often resulted from the canal-irrigation in the upper plains of those great rivers, of which I shall say a word presently. I will only here say that the well irrigation has never been attended with the slightest suspicion of unhealthiness. Then, if the Committee will allow me, I will pass from my experience of Northern India to Bengal proper, of which I will only say one word, because Bengal is much better supplied with water than the North Western Provinces and the Punjab. Very little has been done in Bengal in the way of artificial means of irrigation; in fact the well system does not at all prevail in Bengal. There is something done in the way of storing water, and any traveller who goes through the country by railway will probably see that a great amount of labour is expended in raising water from the railway ditches, and such low places, where it has been accumulated, on to the fields wherever there is any considerable cessation of the rains. But the zemindars have hitherto disappointed us in regard to fulfilling the functions of capitalists, and not much has been done in the way of artificial irrigation in Bengal. I would next come to my experience in the Central Provinces, which is a country totally different from the plains of the Ganges, and which is in its conditions and its system of agriculture, and its system of irrigation, much nearer to the state of things which prevails in Madras. All over the Central Provinces you have a good deal of storing of water in tanks, and of irrigation from tanks. In one part of the Central Provinces especially, which is called the Weingunga district, you have a magnificent system of tank irrigation, and one which is most successful. That system is entirely carried on by the natives themselves,

Chairman—continued.

without any assistance from the Government, and with but very little interference from the Government. The parts of the Central Provinces to which I allude have not been very long British possessions, and the system is rather the native system than the British system. The result of that native system is that the Government doing very little, the people themselves do very much; and in the particular district to which I have alluded, the Weingunga district, you have a class of native cultivators who seem to have a speciality for the making and using of tanks, and they have been extremely successful in doing it; the thing goes on under their village system without, as I have said, much interference on the part of the Government, and certainly with no expenditure of capital, and without any engineering aid on the part of the Government.

Mr. *Onslow.*

1683. What is the area of that district?—I cannot say precisely, but the areas of most of those districts are from 2,000 to 3,000 square miles generally speaking. I cannot state the exact area which is irrigated from those tanks, but all over the Central Provinces there is a system of tank irrigation more or less; and the point which I principally wish to bring out is that it is that not only the Government do not interfere with it, but nobody has ever asked or suggested that the Government should interfere.

Chairman.

1684. In what part of the Central Provinces is this district?—You will find that the Weingunga is a branch of the Godavery, which runs from nearly due north to the east of Nagpore. The results of my experience in the Central Provinces has been that when I hear so much of the neglect of the tanks in the Madras Presidency on the part of our Government, and how such magnificent tanks were made, and how so very numerous tanks were made by the native governments, and how nothing is done by us, but on the contrary they are allowed to fall to pieces, I am very much inclined (without sufficient local knowledge, but merely arguing from my general knowledge of a similar country) to suppose that the fact is that the native governments did not make those tanks, but that they allowed the villagers to make the tanks under their own system of local self-government, and village institutions which prevailed there, under the no-government or the little government of native times. I believe that those tanks were in reality made by the natives under the system of village self-government, and that their failure under our Government is due, not so much to any want of will on our part, as to the mistake which we have made in dissolving that system of local self-government and village communities. Unfortunately I am afraid in India we have been apt to go into one extreme or the other, rather than to maintain those local and self-governing institutions which we found there. In some parts of India we have thought it desirable to create great landholders, and we have expected that they would perform the function of English landholders; but they have not done so. In other parts of India, and especially in the Madras Presidency, we have supposed that the system of combined village communities was contrary to the principles of political economy, and did not give sufficient

Chairman—continued.

sufficient scope for individual energy, and sufficient justice to each individual, and we violently as it were dissolved those communities, and insisted that the Government should deal with each ryot separately. That is a task beyond the power of the Government, and especially it has had the effect, as it were, of untying the bundle of sticks, and those works and other measures of self-government, especially works of irrigation, which were carried on under the native system have now failed where the system by which they were carried on has been dissolved, whereas the Government being a great government has not itself been able to undertake those minute details, and its engineers probably have not been able with all their science, to construct and to maintain those small irrigation tanks, and other small works, nearly so successfully as the natives did in their own rough way.

1685. What is the system of land settlement in the district to which you have alluded?—In the Weingunga district the system is to a great extent still the village system; but there has been a very considerable disposition, and I am afraid a good deal has been done, towards introducing a system which I may call of zemindaree tenure. The head men of those villages have been to a considerable extent recognised as the proprietors, rather than the body of cultivators; but still, for the first few years you have this advantage, and it is a very considerable advantage, that those head men whom you find are the best men, who have attained the position of head men by what I may call a principle of natural selection. The best and the strongest man has ousted the weaker men, and he has become the head man and the leading man of the village; and when we recognise that man as a proprietor, he is a man who has been accustomed to fulfil the functions of the head of the village, and you give him still greater authority, and he is probably able to fulfil those functions with very considerable benefit for the time being. It is not until you come to the next generation, when under more strict laws of property you introduce the system of hereditary succession, and when the son of the strong and good man selected by natural selection may be and very often is a fool, that you find the evils of this zemindaree system. Since I left the Central Provinces the question been farther agitated as to whether injustice has not been done to the cultivators by our introduction of this modified zemindaree system. I understand that several of the settlements have since been revised in favour of individual cultivators, but I have not the details of what has been done since I left those provinces.

1686. But from your general experience of India, you would say that there is no district with which you are acquainted in which the present system of land settlement more resembles that of the native communities than the districts to which you have alluded?—That is so; the native system has only been very partially modified by anything that we have done so far.

1687. And it is to that cause you attribute the success of this irrigation system?—It is so. I should wish to say that there is one part of the country in which the native system has been still more fully maintained, and that is the Punjab, where you have village communities over a great part of the country in fullest force.

1688. Will you explain to the Committee a little more fully what you mean by the village system?—The village system is exactly that which you will find described in Sir Henry Maine's "Village Communities." It is a system under which you have a village corporation, who own the land, and manage their own affairs. The cultivated land is distributed in individual property; the waste land is held in common; the public burdens are divided in proportion to the land held by each; and the management of the village is conducted through a village council, elected by the body of proprietors of the village.

Chairman—continued.

Mr. *Sampson Lloyd.*

1689. Then each man cultivates on his own account; there is no common labour?—There is no common labour. The cultivated land is entirely individual property. There is a reversionary right in the community in case a man should desert his land, but the private property in cultivated land is entirely individual.

1690. What I want to know is, what is the precise benefit of that system, and how it is more beneficial than the modified zemindaree system. I understand the zemindar to be a man cultivating his own land, only in larger quantities than the others in the community?—The word zemindar is very differently used. In Bengal it means a large proprietor, and in the Punjab it means a small cultivator.

1691. But sometimes it means, does it not, a man cultivating his own land?—Yes, certainly; but in England the term has come to be used only as applied to the big proprietor. In the Punjab, if you asked a poor man who was ploughing his land who he was, he would say, I am poor man; I am a zemindar. Where you have a recognised corporate system of local self-government combined with individual property, the consequence is that if you want to bring a canal into a village, or to make a tank, the burden of the labour, and the expense of bringing in that canal or making that tank, are rateably distributed amongst the shareholders, according to their shares. The community, as a body, determine what is to be done, and having determined that, they impose their share of the labour and the expense upon each individual member of the community. When the work is constructed, it is managed by the representative council of the village, who manage what is necessary in order to keep the work in repair, and to bring in the water, and distribute the water to the various members according to their various shares and rights in the village. It is in that way, I think, the system is effective.

Mr. *Onslow.*

1692. In what way does the zemindaree system differ from that?—The zemindaree system differs from it in this respect, that the zemindar in the English sense of the word is the sole proprietor of the village, and the cultivators are mere tenant farmers under him, and consequently the cultivators have no corporate existence; they have no rights, and they have no duties. The zemindar, as we hoped, and expected that he would be, is the capitalist, who will undertake works of that kind for his benefit as proprietor of the village, and who would derive his profit from the increased rent paid by his tenants.

1693. In the one case it is managed by the corporate

Sir *G. Campbell*, M.P., K.C.S.I.

16 May 1878.

Mr. *Onslow*—continued.

porate body, and in the other case by the individual?—Yes; but the difficulty is this, that first of all we find that those individuals have no idea whatever of performing the duties of capitalists. They are quite ready to exact their rights, but they have no idea of performing their duties. In the second place, I think that perhaps what is much more important is, that under our system it really is very frequently not possible for them to perform any duties if they would, because they are under the hereditary system; and under that system, under the Hindoo and Mohammedan law, in the course of two or three generations, the rights of the proprietors are divided up into a great many shares. Generally the land is not divided between the superior proprietors, but they hold it in a sort of undivided commonalty. These are evils of a system of administration, under which no one man can manage the estate without the consent of all the shareholders. Then a very large number of estates are held by widows, who have only a very temporary right, and there are other difficulties of that kind which stand very much in the way of expecting the native zemindars to perform the duties of capitalists.

Sir *Joseph M'Kenna.*

1694. What would be the cubic contents of one of those village tanks?—Some of them in the Weingunga district are several miles in circumference, but they vary from the size of this room to, as I said, several miles in circumference.

Chairman.

1695. Have they the advantage of a river whose supply is more or less permanent?—No; the water is not supplied from the river, the water is supplied from the local rain sources. The district has its name from the river which flows along its borders, but the water of the tanks is not supplied from the river, in fact the river is not dealt with in any way.

I should wish to be allowed to say a word or two about the question of unhealthiness attaching to the canals, which we have heard so much about. Colonel Crofton the other day, and other witnesses, have very candidly admitted that very great unhealthiness does attach to some of the canals in Northern India, and so much is this the case, that I believe it is quite a question whether in the course of many years' unhealthiness, the loss to the population is not quite as great as the gain to the population in one year by what is done to save people from famine by those works of irrigation. I do not think that the question of unhealthiness has been at all sufficiently inquired into, and it is absolutely necessary, in my view, that there should be a much more exhaustive inquiry upon the subject. What I am most anxious to state as the result of my experience is, that I entirely differ from one or two of the engineer officers who have appeared before the Committee, and who say that this unhealthiness is a mere matter of drainage; they say no doubt land near the canals is now unhealthy; but you have only to drain it, and it will become healthy. My experience has been very different. It so happens that I have seen a great deal of this malaria, and I have had practical experience of many efforts to get rid of it, and none of them have been so thoroughly successful as to enable us to say that we at all understand either the sources of this

Chairman—continued.

malaria, or the means by which it may be removed. I may mention that in my early service in taking possession of a new district which had then passed to us, one of the protected Sikh States, there was a place called Khytul, which had been perfectly healthy, but a wave of unhealthiness came over it, and it was unhealthy to a most deadly degree for several years. We tried to find out the cause of this unhealthiness, and we certainly did find that there was a native work of irrigation, a small artificial canal which was brought to the place, and which filled the large tank, which was immediately under the place. Of course the medical men at once attributed the unhealthiness to this source; but when we came to inquire further, we found that the canal, the tank, and the system of irrigation had subsisted long before the unhealthiness, and when the place was perfectly healthy. What happened was that after a few years the unhealthiness passed over, and still the canal and still the irrigation remained, and the place became thoroughly healthy again. The unhealthiness came without any reason, and it went away without any reason that we could discover. Almost the same thing happened with regard to the large station of Loodiana, where I was nearly 30 years ago. That place had been perfectly healthy, and it became unhealthy, and it again became healthy.

Sir *Joseph M'Kenna.*

1696. How long did it remain unhealthy?—Loodiana remained unhealthy for a good many years. There was a peculiarity about Loodiana, and it was this, that while it was tolerably healthy, there was under it a disused branch of the Sutlej in which the water was horribly stagnant, and which was filled with putrefying vegetation, and which according to all the rules of sanitation ought to have made the place deadly unhealthy; but on the contrary it was tolerably healthy. In an evil day we thought to beautify and improve the place by bringing a running stream from the Sutlej, fine clear running water, and with the aid of prisoners whom I had at my disposal, I made a canal, and brought through the place a beautiful stream of water, with fish and all the rest of it, and from that time unhappily the place became extremely unhealthy, and remained unhealthy for a good many years. We had in Bengal an immense amount of inquiry into what was called the Burdwan fever, but the result of the inquiry was not to explain it, but to show this fact, that the fever could not be attributed to any local causes, but it had in fact marched over the country. It marched slowly, year by year over the country, it seized certain districts and it committed great havoc among the inhabitants, and for several years it was a very great plague and disaster to them, and then it passed off, and it went on to other districts. Burdwan was for several years very unhealthy; all our efforts failed to get rid of the fever, and eventually it went away of itself. The evil is still more conspicuous upon the Western Jumna Canal, of which the Committee have heard a good deal, but unhappily the evil has not passed away, it remains to this day, and only now fresh efforts are being made to avert that evil. Of the Western Jumna Canal I will speak presently as regards a large work of which I have had personal experience; but upon this subject of unhealthiness with reference to the panacea of drainage to which the engineers have alluded, there is not the least doubt that, so far as

accumulations

Sir *Joseph M'Kenna*—continued.

accumulations of water upon the surface are concerned, there ought to be a thorough and complete system of drainage; there will be no difficulty in carrying it out, and I have no doubt that it will be carried out; but as respects subsoil drainage I entirely differ from any of the witnesses who have alluded to the possibility of curing the matter by subsoil drainage. I believe that subsoil drainage is impossible in India. There is, as it were, nothing to drain. The soil is perfectly free from any drainable water until you come to that water-bearing stratum from which the wells are supplied; but what happens is this: when you have a high level canal running above the level of the district, the natural percolation in the soil, instead of going from above downwards carrying all the noxious salts with it, is reversed, and comes from below upwards, and you have a slow percolation from below upwards which brings the noxious and injurious salts with it, and which apparently is attended with a great deal of unhealthiness. I do not see myself that any means has been devised by which that evil can be remedied, so long as that canal does exist at its high level.

1697. Those evils which you describe as arising from irrigation, of course, are exclusively confined to the lower plains?—They are confined not to the lower plains, but to the plains on the upper courses of the rivers; I am coming to that presently, but so far as I have been able to learn, this unhealthiness does not attach to the deltas of rivers, to the same degree as to the upper plains.

1698. But the fall of those plains is very slight indeed, is it not?—It is very slight, but still it is sufficient for drainage purposes.

1699. Perhaps you will explain subsequently how those evils do not exist to the same extent in other localities?—I wish I could explain it; the only thing I can explain is that it is not explainable, to the best of my knowledge and belief. I have given a great deal of attention to the subject, and I only state the fact that so far as my experience goes, the irrigation of the deltas is not attended with the same amount of unhealthiness. We have not had the same complaints of unhealthiness in Orissa, and so far as I can gather upon the Godavery and Cauvery deltas there is not very much, although I think there is something of the kind.

I was about to give the Committee something of my personal experience of the large works, because what I have said as regards the Ganges Canal, and other canals of that kind, has been merely general. I have not had much personal experience of the working of them; but I had in my earlier service much experience of the Western Jumna Canal, and that experience was of a very disastrous character, because my district was situated upon the upper part of the canal where the evil very much predominated, and the good was very little. There was a large military station called Kurnaul, which a generation ago was one of the most favourite stations in all India; the scenes of novels used to be laid there, and in every way it was a very large and flourishing station; but after the Western Jumna Canal running through that station came into operation, it became unhealthy to so deadly a degree, that it was found absolutely necessary to abandon it, and it was abandoned and deserted. No doubt, in the upper part of its course that canal was certainly in-

Sir *Joseph M'Kenna*—continued.

jurious; but still I had reason to believe at that time that in the lower part of its course, it did benefit the country, and led to the production of great crops of wheat which at the time when the canal had fallen into disuse, had almost altogether failed. My impression was then quite favourable to the effect of the lower part of the Western Jumna Canal in those days, and it was not until nearly 30 years later when I was a member of the Council of the Secretary of State at the India Office, that I saw very sad pictures of the devastation which has latterly been wrought by that canal, of the unhealthiness which it caused, of the destruction of the fields which it caused, and the many evils which were attached to it according to modern reports, in consequence of which it has been found necessary entirely to remodel that canal.

Sir *G. Campbell*, M.P., K.C.S.I.

16 May 1878.

Mr. *Onslow.*

1700. Kurnaul is not considered an unhealthy station now, is it?—I have no very recent experience of it; it is quite possible that the unhealthiness has passed away, but up to the time that I knew it, it was very unhealthy.

Mr. *Sampson Lloyd.*

1701. May not the unhealthiness which you speak of be caused to some extent by the injudicious application of the water?—The subject is a very difficult one. My personal experience of the actual use of the water, under those circumstances, has not been very great, and the only opinion which I can offer is that the subject has not been exhausted, and that we have not got to the bottom of it, and it is very necessary that there should be much further inquiry upon the subject. I do not think I could offer any very strong opinion beyond that.

In those days I very much advocated a canal of which the last witness, Colonel Crofton, told the Committee a good deal, I mean the Sutlej Canal. The country lying along the plains of the Sutlej is a very fertile country, and the Sutlej itself is a very fertilising stream, but the natural rainfall is so small, that in many of those countries we can only get a good crop about once in six or eight years. I was very much interested in the surveys which were made with a view to the Sutlej Canal, and I am very much rejoiced to know that now it is approaching completion, and I believe that it will be a very great benefit to the country, provided only we can get over this difficulty of the unhealthiness. If, on the other hand, it should be as unhealthy as the Jumna Canal has been, then no doubt it will not be a benefit to the country, but a curse to the country.

There was one view of this irrigation question with which I was very much impressed in my early career, and which certainly has not been contradicted since, and that is that under our system of managing this irrigation through a special engineering department there is a good deal of unpopularity that attaches to that department, and a good deal of consequent prejudice. I think that we have been too much inclined to treat that department as a sort of petted department, to make the canal officers too independent and too much judges in their own cases. The natives do not understand the system of having two masters or several masters. In our early days they had always been

Sir *G. Campbell*, M.P., K.C.S.I.

16 May 1878.

Mr. *Sampson Lloyd*—continued.

inclined to look to the civil administrator as their responsible master, and they do not understand an engineer coming in with an irrigation work who is, to a certain extent, a separate and independent department. They are very apt to make a great many complaints, and to tell a great many stories against the department. No doubt a good deal of that arises from what is expressed by the old proverb, "It is naught, it is naught, saith the buyer." They are asked to buy the water and they naturally depreciate it as much as they can; but still I think the effect of an independent department of this kind, armed with the very large powers which it is only human nature that they should exercise in a somewhat one-sided way (seeing their own side of the case more especially), is upon the whole injurious, and that it would be much better if all the civil and revenue powers were concentrated in the civil administration, and the engineers were more confined to their proper duties as engineers, rather than as revenue collectors.

Chairman.

1702. In what way could the revenue due to irrigation be collected, if you excluded the engineers?—The collectors might collect the revenue and in some provinces they do.

1703. How would you be able to ascertain what was due to irrigation, if it was all lumped under one head of land revenue?—I am now speaking with regard to direct revenue. Supposing it is not all lumped under one head, and a charge is made for the water supplied, that water should be supplied under the orders of the collector, and the engineer should be responsible for his engineering duties for maintaining the canal supply; but, with regard to the distribution of and the charge for it, that should be in the hands of the collector.

1704. In that case you would simply put upon the engineer the duty of maintaining the canal and the works connected with it?—That would be so; but I am not prepared to submit a very definite scheme upon the subject; I merely incidentally stated, and it is an impression I derive from my earlier experience, that a good deal of unpopularity does attach to, and a good deal of friction is occasioned by, the somewhat independent action of those canal authorities.

1705. The natives, feeling that they have two different masters assessing them for practically the same thing?—That is what they feel.

Then I come to my experience of the Orissa canals, of which the Committee have heard a good deal. I have no personal knowledge of the origin of those canals, but after the Orissa famine I was appointed President of the Commission which was sent to inquire into that famine; and, in connection with that subject, I had occasion to acquire a good deal of knowledge regarding the Orissa irrigation canals, which were then in progress. The Commission of which I was the president, recommended that the company to whom those irrigation works then belonged should have the utmost facility for completing those works, but that they should not be bought by the Government. What we found was, that a famine had occurred in Orissa, but that no such famine had occurred for 100 years before, and that we might reasonably expect that it would not occur for another 100 years; and therefore we thought

Chairman—continued.

that there was no such very great hurry for completing the works, and that they were rather necessary, as affording employment to the people at a time when employment was much wanted, and that it would be better that the experiment of a commercial undertaking should be fully worked out, either to success or failure. We were impressed with the belief that the management of those works upon the spot in India was extremely respectable. The head engineer was Colonel Rundall, a well known officer of the Madras Irrigation Department, and we had no reason to suppose that any considerable abuses had taken place in India. But, on the other hand, my impression is, as regards the management of the company in this country, that it partook of the character of the financial undertakings, with which we most of us have had some experience in the City. When it turned out that this work was not likely to be profitable, and when the company were in difficulties, inasmuch as they could not find the money to carry on those works, as they had undertaken to carry them on, and as the Government wished that they should be carried on, it seemed to me the managers in this country a good deal followed the policy which is not unknown on such occasions, of very persistently getting into the way in order that they might be paid for getting out of it; that is to say, they would neither carry on the works themselves, nor would they surrender them to the Government, and allow the Government to do the works. The Government, under those circumstances, wishing that those half-completed works should be completed, found themselves in considerable difficulty. The Orissa Company had not only got a concession of the Orissa works, but they had also got a concession of the Soane works, in Behar, towards which they had done absolutely nothing at all. Then they wanted to impose water rates, which the Government thought extremely excessive; and they wanted to impose conditions which would have interfered with a fair increase of the land revenue in a temporarily settled province which Orissa is. Then, when they did not get what they wanted, they abused the Government very badly in the newspapers; and in the end the result was that Lord Lawrence, whom no amount of rebels, and no amount of administrative difficulties in India would have frightened in any degree, became somewhat frightened as regards the operations of the City financiers in London, and he became anxious to buy those works, and get rid of the company almost upon their own terms. The terms which were eventually agreed upon were that the works should be taken over from the company, and that the money which the company had expended should be repaid to them, plus a certain per-centage. Under certain circumstances that might seem fair enough, but I have been led to believe that when the Government took over those works, they did not ascertain that the money which they paid was actually represented by those works, and that the money had been expended on those works. They took the works which the company had, and paid the money which the company had expended; but no account was taken of the question of how much of that money had been expended upon financing operations in London. I have no direct knowledge on that subject, but I do know this, that some of the best of the engineers

Chairman—continued.

gineers who were taken over by the Government with the works, have assured me that the works did not then represent the whole value of the capital which was paid to the company, and that the expenditure in India was, in fact, very much less than that capital, which stood in the books of the company, and which the Government paid over to the company; beyond that general statement of those engineers I have no precise knowledge on the subject. The only further knowledge that I have is derived from a case which was published in the newspapers in this country a few months ago, and from that it appeared that the per-centage which was paid over to the company was, I think, some 50,000 *l.* or 60,000 *l.* to compensate the company's servants; but the Government, in fact, took over almost all the engineering establishments in India, and the number of officers who were to be compensated turned out to be very small; and it appeared from this case, that I think a good deal more than one-half of the whole sum which was so paid, was awarded as compensation to the secretary alone; so that while everybody else was ruined by this concern, the secretary appears to have made his fortune. I am afraid that is rather a bad precedent, especially as I understand that the same gentleman is now Secretary of the Madras Irrigation Company, and is engaged in a struggle with the Government, somewhat similar to what he was engaged in, in the sale of the Orissa canals.

Mr. *Fawcett.*

1706. In what year was this purchase completed on the part of the Government?—I should think about the year 1868 or 1869.

1707. You say that everyone else was ruined; there was no one ruined except the people of India; the company got the whole of the money back?—Yes, the company got their money back with interest; I meant the people of India, all who were directly concerned with the canal.

Chairman.

1708. What is your opinion of the value of this canal?—I am just coming to my further experience of it. Two or three years later I returned to India as Lieutenant Governor of Bengal; that is to say, in the beginning of 1871, and then I found that the canals had been purchased by the Government, and were in the hands of the Government. The management of the canals as Government canals rested with the Government of Bengal, but merely as agents of the Government of India. It was the Government of India that made the purchase. The purchase was made from the funds of the Government of India, and the profit and the loss resulted to the Government of India; the Government of Bengal were merely their executive agents for carrying out the work. Still I can honestly say that I entered on the subject with a disposition to make the very best of the case, and I did do my very utmost to make the system succeed. I was aided by one of the very best of the engineer officers, Colonel Haig, who, I am quite sure is a man both honest, and honourable, and energetic, and a man who is likely to do the very best that can be done to make the concern a success; but I am bound to state, that so far those works have been most unhappily a financial failure. Now I will try to explain as far as I can the reasons for the failure. I find in some papers which I have perused, that Sir Arthur Cotton has gone into this subject, and that he has attributed the failure to what he called the inconceivable evils of revenue management. I wish to state that, as far as I am aware, that assertion of Sir Arthur Cotton is really entirely gratuitous. I believe that it is not founded upon any statement of any of his own officers, or of any other local officers whatever. It is a mere *à priori* assumption, so far as I know.

Chairman—continued.

1709. What was the statement?—That the failure was due to the inconceivable evils of revenue management. I know of no local source whatever for that statement. So far from the local officers being unfavourable to the canals, the civilians of Orissa, headed by Mr. Ravenshaw, the commissioner, took up the subject with extreme enthusiasm, and were extremely favourable to the canals. The only harm which was done in the way of revenue management was due to over zeal, in favour of irrigation, on the part of one or two young officers who were appointed to do the revenue part of the business, and who, I think, allowed themselves to be carried to excess in almost forcing the water upon the people, and it was that which gave rise to what has been described as howling crowds of people complaining of the action of the irrigation department. However that was very speedily put a stop to, and the consequence was, that as soon as we ceased to force the water upon the people, they refused to take it.

1710. What is the rainfall in the district?—About from 60 to 70 inches.

1711. Is the average in an ordinary year quite sufficient?—Yes, the average in an ordinary year is quite sufficient. It does seem to me, looking over Sir Arthur Cotton's account of the various irrigation works, that wherever they succeed both engineers and civilians are both admirable; but wherever they fail, then the engineers are still admirable, so long as they are not Bengal engineers; but the civilians are detestable, and it is entirely their fault. Where the engineers are Bengal engineers there both the civilians and the engineers are equally in fault. But to continue my experience of those Orissa canals. We found that the Irrigation Company had imposed a price for their water which we thought far too high, and we lowered it; we diminished it by one-half, but we still found that the people would not take the water. We diminished it by one-half again, and still we found that we had great difficulty in getting them to take the water. But with regard to this matter, it is necessary to draw a considerable distinction between the two parts of the scheme, which are practically separate, the Orissa scheme and the Midnapore scheme. In Midnapore it turned out that the people were comparatively willing to take the water, and did take the water, and for some time we were sanguine that the Midnapore canal was going to be a success; but it unhappily turned out at Midnapore that the sources of the Midnapore river being very near, as soon as we had a disastrously dry year the water in the canal failed, and we were able to give very little irrigation; and thus we were in this dilemma, that in Orissa there was plenty of water, but nobody wanted it, and in Midnapore everybody wanted it, but there was no water to give them, or very little water.

Sir *G. Campbell*, K.P., K.C.S.I.

16 May 1878.

Sir *Joseph M'Kenna.*

1712. What was the price charged for the water that was objected to as being too high?—The company wanted very high rates, but when I took charge the price asked was four rupees or eight shillings an acre for the rice crop. We diminished it to four shillings, and eventually we diminished it to one rupee or two shillings an acre for the rice crop.

Then there was another circumstance which very much detracted from the success of the Orissa works. The engineers did very persistently assert that it was all prejudice on the part of the natives, and that they did not know what was good for them, when they would not take the water, and so they said, "We will show you the effect of the water; we will establish model farms; we will take up land and will show you the effect of our canal water." But ultimately it appeared that those engineers, although they were excellent engineers, did not know very much about agriculture, and I am afraid that they were allowed to deceive themselves by taking up land which was not cultivated by the natives simply because it was very bad land. At all events they took up the land and established model farms, and distributed the water over the land in a most admirable manner. They sowed their crops, and said to the natives, "Now you will see the benefits of irrigation"; but when their crops came to maturity they turned out to be a dead failure. The natives, who are knowing enough upon those subjects, jeered at them immensely, and said, "You pretended to show us what you could grow by irrigation, and the result has been that your crops are infinitely inferior to our crops without irrigation. Do not come to us and pretend to teach us how we are to secure large crops."

Mr. *Onslow.*

1713. That was in a year when there was plenty of rain, was it not?—It was a year in which there was the average quantity of rain. In my opinion the main cause of the failure of the canal system in Orissa is that in nine years out of 10 there is enough rain without canals, and that in the tenth there is so much rain that they can manage to subsist without thinking it worth their while to pay for the canals during the nine years when they do not want them, in order to have the benefit of the canals in the one year when they do want the water; and the consequence is they are inclined not to take the water until the rains have actually failed. That no doubt is a cause why those canals are not likely to be financially very successful. But there is another difficulty behind which, I believe, very much hinders the fair success of the Orissa canals, and it is the difficulty of distributing the water to each ryot's field. It is almost impossible that the Government should make the distributory by which the water should be supplied to each separate ryot. Those who are acquainted with the system of cultivation in India must know, not only that the farms are very small, but that each farm under the system of distribution of land in India generally consists of a number of separate fields, often very widely apart from one another; and the consequence is that each field probably, on an average, does not exceed a quarter of an acre, or certainly not half an acre. It is very difficult for the Government to make channels to each individual ryot's field, and to supply every man who has a small

Mr. *Onslow*—continued.

field with water, when he wants it, and as he wants it. Practically, it is almost impossible for the managers of those large canals to distribute the water otherwise than in a lump. If they can get a large zemindar to take it, or if they can get a village community to take it, as they do in the North West, and the Punjab, they say, "Here is your channel; we will supply you with running-water in this stream so many days in a month, and you make your own minor channels for yourselves, and distribute it amongst yourselves." The matter is then easy enough; but where you have no system of that kind, as unfortunately you have not in Orissa, there is very great difficulty about it. It is found that if a single ryot asks for water for his field, it is impossible to give it to him, because you cannot give it to him without crossing a great many other people's fields, and then, if you do give it to him, the engineers generally say, "He makes an arrangement with us and pays for his own field; but by another arrangement he lets it out on the field of his neighbour, who does not pay at all"; so that we have but little hope of succeeding in these great Government undertakings, unless we can get somebody, either the zemindar, or the village community, or somebody else, to take the water in the lump, and not in the very minute detail, which would be necessary if the Government undertook to supply the water to every separate field and every separate ryot. That, I believe, has been a very great practical difficulty.

Chairman.

1714. What is the land system in Orissa?—It is a very peculiar system in Orissa. There is a system which amounts to a limited zemindaree system. Under the zemindars, according to the original system, the ryots had very strong rights of occupancy, but, unfortunately, those rights were not protected, and in the course of time they have been very much weakened; it is a subject regarding which there has been a great deal of official discussion, which did, in fact, become rather polemical at one time, so that it would be a complicated thing to explain exactly the system at this moment to the Committee. There is only one more word which I wish to say regarding the Orissa canals, and that is with regard to the question of connecting the Orissa canals with the Midnapore canals, and so establishing a complete through system of communication between Cuttack and the Temple of Juggernaut at Pooree and Calcutta. That was a part of the original scheme; but whilst I was in office I opposed the prosecution of that canal, because I thought it would be very expensive, and I found that there were such great facilities for sea communication, that I did not think it desirable to expend a very large sum in establishing an inland water communication. I devoted such funds as I could find rather to the improvement of the harbour at False Point, thinking that, for many reasons, it was very desirable that there should be, by means of that harbour, a communication between Orissa and the outer world, the natural facilities for a harbour being very considerable there. That harbour was put into communication with the Orissa canals, and from False Point it is little more than 24 hours by sea to Calcutta.

1715. Then the result of your experience concerning these particular canals is, that a London company undertook to construct irrigation works without

Chairman—continued.

without imposing any cost upon the revenues of India; that little by little the Indian Government were forced to interfere, until they had to buy at a very high price the works which had been constructed by the company, and have since been forced into a very large outlay upon a project which, up to the present moment, does not pay even its working expenses?—That is so.

1716. Perhaps you remember an extract from a despatch which I read out the other day in the examination of Colonel Crofton, from which it appeared that, whereas the estimate of 1871, which was made by the Indian Government for the completion of those works, amounted to only 2,077,000 *l.*; in 1876 it had increased to 6,228,000 *l.*?—That is so.

1717. Therefore those proceedings did not encourage the Indian Government in assisting financial companies in England to promote irrigation in India?—Certainly not.

1718. Was there not a proclamation issued by Mr. Ravenshaw in Orissa, by which he undertook that no increase should be made to the land revenue, which rather complicated the difficulty?—Yes, that is a very thorny point. In my opinion, no proclamation was issued which really had the effect of pledging the Government, but what happened was this: Mr. Ravenshaw was, as I have stated, very enthusiastic in favour of irrigation. The canal officers and others said to him, "It would not be fair that the Irrigation Company should spend their money on improving the country by those irrigation works, and you should reap all the benefit by making the people pay an increased produce in the shape of revenue." Mr. Ravenshaw in, I think, a speech, not in a proclamation, without any authority from the Government, took upon himself to say, in very general terms, that the land revenue would not be increased on account of the people using the canal water, and no doubt very much was made of that statement of Mr. Ravenshaw, and it was attended with considerable complication.

1719. Do you think that the proclamation, or as you have called it the speech, at all affected the success of the canal?—No, it was calculated to promote the success of the canal, but it was not effectual in promoting that success.

1720. We know that those canals have been a heavy financial loss to the Indian Government; do you think that in the case of the canals in Orissa, they have derived no indirect advantages out of them, which would at all compensate them for that loss?—In Orissa there has been no indirect advantage whatever, except that a good deal of money has been spent in the province.

1721. Do you think that hereafter the financial position of those works is likely to improve?—I have not much hope that the financial position will improve to the extent that they will pay. We calculated in Midnapore, that supposing the whole of the water to be taken up which the canal supplies, and a reasonable rate to be paid for it, still the canal would not pay. That calculation was made by Colonel Haig, a man who is honourable and impartial, but who certainly is not prejudiced against canals, and therefore the conclusion which we came to was that the Midnapore Canal never could pay, although it was so far successful that the people were quite willing to take the water. As regards the Orissa Canal, the question still lies very much in the future. Whether in course of time people may be induced to take the water at a moderate rate is entirely a matter of opinion; but, so far as my experience has yet gone, I am bound to say that things do not look very hopeful.

Chairman—continued.

Sir *G. Campbell*, M.P., K.C.S.I.

16 May 1878.

1722. The Government of India were induced, were they not, to sanction the formation of this Orissa Company in the belief that they would obtain very large receipts from the extension of irrigation in that part of the country?—That was the belief which the Government were induced to entertain by the representations which were made.

1723. Who made those representations?—That I do not know.

1724. You do not know who officially recommended this scheme?—I do not.

I should like to be allowed to say a word with reference to a statement of Colonel Crofton's. He said as a reason why the canal did not pay, that many of the works were designed for a much larger scheme, and as only smaller schemes have been brought into operation, the works were unfairly weighted. I know those works pretty intimately, I had a very intimate connection with them, and in my opinion there is some error in that statement. It is perfectly true that the headwork, or what I call the anicut at the head of the delta, is a work which is capable of supplying a good deal larger schemes than those which have now been actually executed, but after all that is only a certain proportion of the cost, and is not in itself a very overwhelming cost; the anicut once being formed every separate division of the work can be taken up and has been taken up as a separate and complete work in itself, that is to say, having at a central point made your anicut; if you determine to make a canal to irrigate a certain part of the district; that is a work which you may complete, and which you have completed. Then you take up another part of the district and you make another canal; that is also a work which is to a certain extent complete in itself; that is the system which we have followed. We have taken up certain parts of the district and we have covered them with canals, and given them the means of irrigation, but I do not think it is the case, that beyond a certain proportion of the cost of the central anicut those works are unfairly weighted by any very large amount of unproductive capital.

Mr. *Sampson Lloyd.*

1725. I think you said that the average rainfall in Orissa in ordinary years is quite sufficient, and that is confirmed I see by the Blue Book before me; would you go so far in your evidence as to say that the construction of those irrigation works in Orissa, quite apart from financial mismanagement, has not been of any real substantial benefit to the district?—If we were to begin again, I would not construct those Orissa works.

1726. Not even for navigation as well as for irrigation?—If it were possible to construct them at a comparatively very cheap price for navigation, I should be prepared to do it, and I think the navigation channels have been of very sensible advantage. But this enormous work which is now estimated to cost, I think, upwards of 6,000,000*l.* sterling, I certainly should not undertake if we were to begin again; and for this reason, that although the experience of 1866 has shown that

Sir *G. Campbell*, M.P., K.C.S.I.

16 May 1878.

Mr. *Sampson Lloyd*—continued.

Orissa is liable to most terrible and most destructive famines, causing a fearful loss of life, perhaps once in 100 years, on the other hand the total population of Orissa is not very great, only some 3,000,000, I think, and my opinion is that if the harbour at False Point were made sufficient, and one or two other petty local harbours were improved, they would give a means of communication by sea, and would by that means amply supply the necessities of such a famine as occurred in 1866, which was so deadly as it was only because the communication by sea was almost entirely cut off in the monsoon season when the famine was at its worst.

Mr. *Onslow.*

1727. You may have heard of a line of railway from Calcutta to Nagpore; if that line were made it would diminish, would it not, the probability of famine, or at all events, the loss of life to a considerable extent?—One alternative route for such a railway would be through Orissa, and if that were made I think it would be almost a complete security against any serious risk of loss of life during a famine in Orissa; but it would be a very expensive railway, for the drainage is very heavy through that country.

Mr. *Sampson Lloyd.*

1728. I rather gather that you would not have constructed those works if you had had the management of them from the beginning, but that being constructed, notwithstanding the financial mistakes, they have conferred a benefit on the country in the shape of navigation?—It is very easy to be wise after the event; I cannot say that I might not have done a foolish thing; what I say is, that with our present knowledge I do not think the canal would have been constructed; but it is the case that it has been of very considerable benefit from the navigation.

Sir *Joseph M'Kenna.*

1729. I think the sum of your objection to the Orissa Canal may be put into these words, that the cost is a cost applicable to a continual supply, and that the real demand is only occasional?—That is entirely so.

Chairman.

1730. The expenditure is certain, and the benefit is uncertain?—Yes, and I do not doubt that once in 100 years it would be a very great benefit.

1731. You wish, do you not, to make some observation on the Soane Canal?—As regards the Soane Canal, that was originally conceded to the Orissa Irrigation Company, but they did not do anything; and for the actual work it had a much better origin, as it was a pet scheme of General Dickens, who was examined the other day. He had been executive engineer in that country, and he planned and devised the works. It was a scheme which he pushed at the time when he was Secretary to the Government of India, and was consequently the head of the department in the Central Government. The scheme was, I think, commenced, or at all events was determined to be put upon on a very large scale, at the time when I was Lieutenant Governor of Bengal. The Government of India sent a despatch to the Government of Bengal in which they said, "We propose to make this canal; we inclose estimates showing a very great

Chairman—continued.

profit; have you anything to say." The reply which I made was, "I think it right to warn you that your estimates are not worth the paper that they are written upon. They are mere fancy estimates, and they can only be fancy estimates, for this reason, that the *data* and statistics do not exist. We have not got a sufficient survey; we have not got the revenue details for Bengal, which they have elsewhere; and therefore these estimates being founded upon no actual *data*, they are mere fancy estimates; and I warn you that they are worth nothing at all. For the rest," I said, "my impression is more favourable to a canal in the Soane country than in Orissa; I do not undertake to say that it will pay; all I can say is that if you choose to make the work, I have no objection." That is what my reply amounted to. Upon that the Government of India said, "Very well; we will make the work," and they proceeded to make it. But with reference to the origin of the canals, I have felt it to be somewhat hard, that the other day when the new financial arrangements were made, the Government of India said to the Government of Bengal, "A loss has accrued upon these canals, upon the Orissa Canal, and so far upon the Soane Canal, and you must make good that loss," I certainly would have been inclined to say, "The Government of Bengal at the time warned the Government of India that they had no reliable statistics; the thing was undertaken on the part of the Government of India, the Government of Bengal were not responsible." Therefore I do think it rather hard that the Government of Bengal has been made responsible for the deficiency which has occurred with reference to this income.

1732. But there is a prospect of their paying, is there not?—Providence seemed very much to favour the Irrigation Department, for not only did a famine occur in Orissa at the very time that the Orissa Canal was under construction, but at the time when the Soane works were under construction a famine occurred in the part of the country where those works were designed to be constructed, and the works were then so far advanced that by giving the water gratuitously we really were able to save a very considerable portion of the crops and to do a very considerable benefit to the country. The natives benefited in that season of drought by the water which was given to them gratuitously. I was very hopeful that they would take the water, and therefore I was very much disappointed to find that the two or three following years when the canal was partly completed they did not take it as had been expected. However I understand that by the most recent accounts things look a good deal more favourable. I have seen the speech of Mr. Eden, and it is only necessary to observe that that speech was made to justify an irrigation tax, and therefore it is natural that the most favourable view of irrigation should be stated; at the same time I have no doubt that from the point of view of an advocate of an irrigation tax, Mr. Eden would state his views fairly, and they seem to show that there is at present considerable prospect of greater success being obtained with these Soane works than had at first seemed probable. What I am apprehensive of is this, that I gather from his statement that the form in which he hopes that success would be obtained is through the great zemindars taking water and distributing it to their ryots. Now, inasmuch as

in

Chairman—continued.

in Bengal the question of the relative rights of the zemindars and the ryots is a very disputed question, inasmuch as the ryots are not mere tenants at will, but have considerable rights of their own, I have considerable apprehension that if the water gets entirely into the hands of the zemindars and the distribution rests with them, it may be very difficult for the ryots to hold their own, and that the right of distributing water resting with the zemindar will give him a very large amount of authority which he would not otherwise have possessed. I have been a good deal influenced in that view by what I saw in Egypt during the past autumn when I looked somewhat narrowly into the irrigation system in Egypt; and there I found that the head man who had the distribution of the water very generally acquired a very disproportionate amount of the best land, and seemed to have very great advantages over those who had not the regulation of the water in their hands. However I have no exact personal knowledge as to the present state of things in reference to the working of the Soane Canal; but this, it is necessary to state, that that is a permanently settled district, so that you must rely for any hope of benefit entirely upon the direct revenue which you may receive from the sale of your water, and there is no possibility of obtaining any indirect profit from the increase of your revenue as the law now stands.

1733. What is the next portion of the subject with which you wish to deal?—The Orissa Canal and the Soane Canal are the only canals in actual operation in Bengal, but during my incumbency there great schemes were surveyed and discussed for the irrigation of the country north of the Ganges, the Soane Canal being south of the Ganges. The country north of the Ganges is naturally much better watered than the country to the south; it is, to a certain extent, a continuation of the Oudh and North Benares country, in which I had also served, and to a great extent of the same character. I am aware, that both with regard to North Behar and with regard to the Oudh country, great schemes for irrigation from the Sardha and Gogra and Gundak have been proposed; but it was found that those schemes were excessively expensive, and the whole country being naturally comparatively well supplied, the benefits were not so apparent. What was a surprise was this, that although it was proposed to make those canals entirely at the expense of the Government, both the zemindars and the European planters energetically protested against them. No doubt they had reasons of their own into which it is not necessary to go here; it would have deranged their system; but if there was a prejudice it was a prejudice which was felt and expressed quite as much by the European planters as by the native zemindars.

1734. Without going minutely into the reason given by the zemindars and the indigo planters, what was their general objection?—One objection made in North Behar, and which was very gravely urged by many considerable European planters and others, was this, that irrigation was deleterious. They said that they managed to grow not only barley and such dry crops, but opium and the finer crops there without irrigation, but that when a field was once irrigated it was very much deteriorated and was good for nothing ever after. They said that irrigation caked the soil and spoiled it altogether; and to this day I believe that both the planters and the zemindars believe, in North Behar, that irrigation is deleterious. They do not use wells there.

Chairman—continued.

1735. That scheme for the irrigation of that part of Bengal proper which is north of the Ganges, was stopped, was it not, by Lord Northbrook?—After a full discussion, looking to the objections of the people interested, and looking to the want of extreme necessity for such a large expenditure, Lord Northbrook decided, and in my opinion rightly decided, not to prosecute those schemes.

1736. And I think the arguments in favour of the scheme are contained in that memorandum of Colonel Rundall's, which has been put in evidence, and the objections to the scheme were contained, I think, in the reply by the Government of India to the memorandum?—I think that was so. The only other schemes in Bengal of which I have any knowledge were two schemes of Sir Arthur Cotton's. One was to bring a grand canal from the Ganges to Calcutta, and the other was what has been mentioned as the Damooda scheme. I think that the Ganges Canal was designed more for navigation than irrigation, but at the same time it was also urged upon the Government that it would be extremely useful for irrigating Nuddea and other districts. That scheme was a good deal urged upon me during my incumbency in Bengal, but it seemed to me that the project was in so very rude and inchoate a form, and the difficulties were so great, that I declined seriously to entertain it. It involved the making of a great dam to stop the flow of the Ganges, just at the point where it is at its very largest, where it has received all its feeders, and before it has begun to distribute its waters among the channels of the delta. There was nothing like a reliable estimate of the expense of such an enormous work, and I was very much inclined to believe, from my knowledge of the habits of those great rivers where they run through a plain country, that if you dam them up at one spot the only result will be that they will run somewhere else, and leave your dam high and dry, which has very often happened in the case of bridges. That being so, and seeing that the districts of Bengal which were to be benefited by the irrigation were districts which had already plenty of water from nature, and looking to the fact that where the Ganges and the East India Railway run side by side, the railway is beating the river, and the river not beating the railway, I came to the conclusion that to enter upon a very great scheme of this kind was not desirable. I was perhaps a little afraid of once letting in Sir Arthur Cotton and his schemes, for I did not know when we should get them out again. As regards the Damoodah Canal, I was at one time rather favourably inclined towards it, but it was more with reference to a supply of good water to Calcutta than for other purposes.

1737. Where did the Damoodah scheme start from?—It started from near Raneegunge, about 120 miles from Calcutta, upon the main line of the East India Railway. As Calcutta was supplied with water from other sources, and as the communication was amply supplied by the two lines of the East India Railway, and as the perennial supply of water for irrigation upon the Damoodah was not good, I thought it was better to let that scheme drop.

Sir G. Campbell, M.P., K.C.S.I.

16 May 1878.

Chairman—continued.

I should like to mention that while I was in Bengal, being an *ex-officio* member of the Legislative Council of the Governor General of India, there was at that time a discussion of those plans for compulsory irrigation which were designed and proposed by General Strachey. His view was, that irrigation was very necessary, and very desirable for certain parts of India, and that the natives so little understood their own interests that they would not take the water, or at all events, would not pay for the water, and that, therefore, the best way was to make your irrigation canal, and to say to the natives, either you will take the water voluntarily to such an extent that the canals will pay, or any deficiency shall be made up by a compulsory rating; so that, in fact, you must pay for the canal, whether you take the water or not, and you may just as well take it. The difficulties of tenure are such, the difficulties of distribution are such, and the practical difficulties of detail of many kinds are such, that I quite admit that if you could ensure that no irrigation scheme should be undertaken, which was not in itself thoroughly wise and good and paying, there would be a good deal to be said in favour of that compulsory system; and the more so as the Madras canals, which have suceeded, have, as I understand it, practically succeeded under a system, which is for the most part really compulsory; that is to say, the irrigation rates were amalgamated with the revenue rates, and the revenue rates being in the discretion of the Government, they were imposed upon the people without much option on their part. It is certainly admitted that any man in Madras who has once taken the water, and is registered to the wet rates, has no option of withdrawal, and for him, of course, it is absolutely compulsory, and I understand that, in practice, the introduction of the water system in the Godavery district was really compulsory, and it being introduced in that compulsory way, and being, as it turned out, a really good scheme, that Godavery system has succeeded.

1738. In the rest of Madras you believe the system to be, practically, that of compulsory rating for irrigation?—I cannot speak as to the rest of Madras; it is known that the Cauvery system is a very ancient system. I do not know the details of the tank system in Madras, and this is only what I understand as regards the Godavery irrigation.

1739. The tank system differs from that of the canal system in this, that the whole of it is under the collector, is it not?—It is, I believe, under the collector, except, as I think, Colonel Crofton told us in some special cases, it is under the engineers.

1740. As a matter of practice it is the land revenue officer who regulates the irrigation of Madras and not the Public Works Department?—I believe that is so. What I wished to say was this: I quite admit that supposing you were quite sure that your scheme was thoroughly wise and good, there is a good deal to be said in favour of the compulsory rating system on account of the practical difficulties in connection with the tenure of land, which otherwise stand in the way of any other system; but what it seemed to me was this, that at that time the Public Works Department were, what I may call somewhat rampant, and public opinion was very much in their favour, and I was very much impressed

Chairman—continued.

with the belief that if such a law was passed as that which General Strachey introduced in the Council of the Governor General, that department would break loose, and would cover the country with great and very expensive irrigation works, and they would insist upon a compulsory tax upon the country to make up for their failure, which would really be very disastrous and very injurious.

1741. Do you think there would be any political danger from imposing such a compulsory tax?—There is always a certain political danger from imposing unjust taxes, and so far as the tax might be unjust, it would be a source of political danger; at all events, the Secretary of State at that time, the Duke of Argyll, took a view which I fancy was, to some extent, of the same character as that which I have represented, for he negatived the plan altogether. Since that time there has been a sort of modified compulsory cess; that is to say, the Committee were told the other day by Colonel Crofton that a law has been passed in the Punjaub and the North Western Provinces which does in a certain form legalise a compulsory cess, although it does not seem to have been yet put into practice; and in Bengal the deficiency which has occurred in the working of the canals is now to be raised by a general cess upon the whole province; for practical purposes, that is, a compulsory irrigation cess, only it is imposed upon the whole province, and not upon the localities which are supposed to be specially benefited by the irrigation. There was a question between those two modes of procedure: one procedure was to tax only the localities benefited by the irrigation, and the other was to tax the whole province, and I think Bills were introduced for both purposes, but the Bill for imposing a special irrigation cess upon the localities benefited has been dropped, and the other has been carried out, which assesses the deficiency of the Orissa and the other canals upon the whole province of Bengal. That, I think, is all that I have to say as regards my personal experience on the subject of irrigation. There are one or two points with regard to communications as a means of preventing famine in respect of which I might be allowed to say a word or two.

1742. Perhaps you will now state your experience as regards the railroads in mitigating or preventing famine?—Railroads are used for so many other purposes, as well as for preventing famine, that the subject is one which it would not be desirable that I should dwell upon at length probably at this time; and therefore, I will only notice one or two points with regard to the special use of railways in times of famine. I am very much convinced of this, that railways, by increasing the facilities of communication, do very much to obviate the future risk of famine; in fact, I think the experience which we have recently had in India almost justifies one in saying that when a complete system of railways is in work throughout India, provided sufficient foresight and care is shown, and sufficient money is forthcoming, no real famine leading to a very great loss of life need occur; but as regards the working of railways during famine, what I have observed is this, that traders like agriculturists and other people have their own habits and their own prejudices, and that it is not very easy very suddenly to make them change from one groove

to

Chairman—continued.

to another groove. There are generally traders in all countries, and in India, I may say they are especially energetic and zealous traders in carrying out their own forms of trade in their own way, but they do not understand a very rapid change to another way; so that when the whole system of the country is deranged by a famine, we have not found that the full use of the railways is at once made by the private traders to the extent which we might expect. For instance, I might mention as a curious instance, the way in which traders are apt to follow their accustomed groove, and not easily to get into another groove. In North Bengal, the district of Dinajpore, and the adjoining districts are generally great grain producing districts; there is a very large export trade of grain, and the traders of the country are very largely engaged in that export trade. During the famine of 1873-4, the crops in those districts altogether failed, and instead of exporting grain from Dinajpore and those districts it was necessary to import grain. But we found that the traders who had been accustomed to exporting grain did not understand importing it as it had not been their habit; they had never done such a thing and did not know how to do such a thing; they did not know where to go for the grain, and as a matter of fact, in the early part of the famine, they did not import grain although prices were such as would have justified them doing so. That was so with regard to other districts also; and the consequence was that in the earlier part of the Bengal famine, when we saw that that famine was inevitable, when we saw that it was necessary to make provision for that famine, so far as the private trader was concerned, the railway was lying comparatively useless, it was not worked up to its full power, and most excessively valuable time was passing during which the necessities of the country were not supplied by private trade, because the circumstances were such that the old habits of the trade had been entirely reversed. It was at that time that I thought it necessary, and the Government of India thought it necessary and desirable, that the Government should lose no time, and should provide for the needs of the country by utilising the railways and channels of communication which private traders were so far failing to recognise; and at that time large quantities of grain were introduced by the Government, and were carried into the suffering districts by the Government when the private trader had certainly failed to perform his function. So far, I think, that in the early part of the Bengal famine a distinctly useful function was performed by the Government in making the utmost of the means of communication which private trade had failed to do. Then a further difficulty is this, that while in the early part of a famine it has happened that the railways are not sufficiently used, when you come to the pinch of the famine, when all doubt is at an end, when there is a certainty of profit to those who import grain, then the railways are apt to be choked; great as are the capacities of the railways, they are not unlimited, and you are not able to meet the whole of the demands of private trade coming upon you suddenly at one time. The question arose, and I think has especially risen in the late famine in Madras, that when you have a much greater demand by the trade for carriage by railway than the railway can supply, an abnormal profit is given to those

Chairman—continued.

Sir *G. Campbell*, M.P., K.C.S.I.

16 May 1878.

traders who are fortunate enough to secure the means of transit. I understand that this was so to a very large extent during the late Madras famine, when the Government altogether abstained from interference; that is to say, the demand upon the Madras Railway for carriage was far greater than it could supply; and consequently the grain carriages were allotted as fairly as possible in a rateable manner to the different traders, but the general result was that those traders made enormous profits, because the selling price of the grain at one extremity of the railway was quite disproportionately large as compared with its purchased cost at the other extremity of the line. I had also this experience during the Bengal famine with regard to the communications by railway, that although the traffic from the lower districts to the upper districts, that is to say, from Bengal proper to Behar, was almost monopolised by the Government to such an extent that political economists declared that the private trader must necessarily be frightened away; as a matter of fact that was not so at all. On the contrary, concurrently with the enormous traffic in Government grain which was carried up by the East India Railway from Calcutta to Behar, there was an equally enormous traffic in private grain which was brought down from the Punjab and the North West Provinces to the same country by private traders, by means of the upper part of the East India line, and which contributed to save the country from famine fully as much as did the operations of the Government. Then, as regards the question of water communication as contrasted with communication by railway, our experience in Bengal was that the water communication on that occasion almost entirely failed to supply the wants of the country; communication by water by means of the Ganges is so slow and so risky that comparatively little was done by that method, and the relief of the Bengal famine was almost entirely due to the operation of the railway.

1743. Was it not the fact that the water communication upon which, to a great extent, you depended in Upper Bengal entirely failed on account of the drought?—To some extent that was so, but I do not think it was so to a very large extent.

1744. There would always be that danger, would there not, in mainly relying upon water communication, that when there was any serious drought, from want of water, your transport would be altogether stopped?—In many parts of the country that would be so.

Mr. *Onslow*.

1745. What was the difference between the rates on the canal and on the railway for carrying grain at the time of the famine?—I could not state precisely; no doubt the river rates would be somewhat lower, but then they were very much slower; I could not state the exact rates.

1746. Have you read the last report of the East India Railway, in which the chairman rather forcibly brought out the difference between the carriage rates on the railway and on the canal?—I have not noticed it.

I should, however, also say that in the greater part of Bengal, especially Eastern Bengal the great rivers are so enormous, the difficulties of crossing them are so great, and the permanent railway

Sir *G. Campbell*, M.P., K.C.S.I.

16 May 1878.

Mr. *Onslow*—continued.

stations are so liable to be washed away, that I think it would be very difficult indeed to rely upon the railways in the Eastern Bengal country. For instance, a very successful railway, the Eastern Bengal Railway, has its terminus at a place called Goalundo, near the meeting of the Ganges and the Brahmapootra. Enormons efforts have been made to maintain that station; all the best engineering talent in the country has been used to devise means of maintaining that station. But the rivers have beat us and the station has been carried away; it was impossible to establish a permanent station there, and much less to bridge the rivers. Therefore I still think as regards Lower and Eastern Bengal, it is very desirable that we should try to develope and improve the water communication as much as possible, because although those countries may not themselves be liable to famines, still they are the great granaries from which the means of relieving famines in other parts of India are obtained, and it is most desirable that there should be the fullest means of communication with them.

1747. Do I understand you to say that the station has been carried away, so much so that steamers cannot come to it as formerly?—Yes, it has been carried into the river.

Chairman.

1748. Have you finished that portion of your evidence which relates to your personal experience?—I have.

1749. Perhaps you would wish also to favour the Committee with some opinions. I should like, therefore, to ask you what is your opinion as to the present system of constructing public works of a certain class out of borrowed money?—Perhaps I might first take it as regards the prevention of famine: in that view, of course it is necessary to weigh on the one side the cost of the works, and the accumulated cost of those works during the many years in which they may not be required, and on the other side the benefit which is obtained from those works in preventing famine in the years in which famine would occur but for those works. In order to work out the calculation, it is absolutely necessary that we should form some idea how often famines are likely to occur. I have devoted some attention to that subject, and I am inclined to think that we are apt to labour under a good deal of delusion about it, because India is a very large country, and perhaps we do not bear the geography of it exactly in mind; and when people tell us that famine occurs in India on an average once in 10 years or so, we are apt to speak as if India was one country, and famine occurred every 10 years in that particular country. Now, the error which I think underlies that popular view of the case is, that India is so large that it consists of many countries and climates; and although it is perfectly true that famine does occur in India once every 10 years or so, it certainly is not true that a famine occurs once in 10 years in any particular part of India. On the contrary, I am inclined to suppose that even excluding such districts as Eastern Bengal and others which nature has almost protected from famine, it will be found that as regards any particular province or country in India it would be more correct to say that you may expect a famine once in 100 years than once in 10 years. I was in hopes

Chairman—continued.

that a paper might have been presented to the Committee, showing from the records of the India Office all that is historically known regarding famines in India, but I understand that a paper of that kind, which the Secretary of State was good enough to direct should be prepared, is not quite ready yet, and at present I have only got a very rough list, which has been made by Mr. Danvers of the India Office, in which a very large number of famines is made to appear: but when I look more particularly into this statement, I find that this list contains several serious famines, and several famines which were altogether of a minor character, and a good many seasons which really amounted to little more than seasons of scarcity, and not what I should call real famines. Therefore it is very necessary to distinguish the really serious famines from those partial scarcities which may be mixed up with them. In confirmation of the view which I have suggested to the Committee, that when the facts are thoroughly sifted, it will be found that in any particular province it is perhaps only once in 100 years that we may expect a famine. I would instance three provinces in which we have recently had most striking famines, Bengal, Orissa, and also one of the driest countries in India, namely, the Punjab. I have mentioned that in Orissa it is a matter of fact that, for the 100 years before the famine of 1866, I believe there had been no serious famine. As regards Bengal, it is the case that for a little more than 100 years before the famine of 1873-74 there had been no great famine, because the last great famine in Bengal was that which took place in the year 1870. Not only is that so, but in the Punjab, which is an exceedingly dry country, it is a matter of fact that the last serious famine which took place was in the year 1783, which is now 95 years ago. There has been no serious famine in the Punjab for 95 years, and I hope in the mercy of God it may possibly be that a good many years may elapse before there is such a famine. I have only been able to go over the matter somewhat roughly, but my impression is that the serious famines which have occurred in India since we obtained possession of the country somewhat more than 100 years ago were the following. There were certainly two very great famines in the early part of our administration, but it happens, curiously enough, that they were so delimited that they scarcely in any degree overlapped, that is to say, the country which was affected by one famine was precisely that which was not affected by the other. The first famine was the great Bengal famine, to which I have alluded, in the year 1770, which affected the Western and Central Provinces of Bengal and Behar, excluding the eastern district, and which was a very serious famine indeed. The other great famine was that of 1783, which desolated, and for a time almost depopulated, the Punjab, which was very severe throughout the North West Provinces, which was partly felt in Oude, and which came down to the limits of Behar, but which did not overpass those limits. Perhaps I may be allowed to put in an account of those famines which I drew out from the records of the India Office when I was officially employed to do so in the year 1867, which I think has not yet been published (*the same was delivered in*). So far as I have been able to ascertain from a somewhat summary inquiry, although there has been an allusion to famines

Chairman—continued.

famines in Madras in the last century, I gather that they were local and partial, and that they were more due to the calamities of war than to very disastrous seasons. But there certainly have been two very severe famines in Madras during the present century; one in the year 1825, which affected the ceded province of Bellary and the neighbouring districts, and also the districts known as the Northernly Circars, the present Godavery and the Vizigapatam districts. Then there was another very serious famine in Madras in the year 1833, which affected the same districts, but chiefly those districts known as the Northern Circars; which latter famine, I believe, was the occasion of the construction of the Godavery Irrigation Works which have been so successful, and which seem to have protected a district, which had hitherto been specially liable to famine. I do not find that there has since been any very general famine in the Madras Presidency till the recent famine of the past year. Then as regards the North West Provinces, I find that there was a great scarcity in the year 1803-4, which has generally been spoken of as a serious famine; but on looking over such papers as I could find in the India Office, I have come to the conclusion that it was only a very serious scarcity, and not a famine of a very extreme character. In the year 1837-38, there was a very severe famine in the North West Provinces of India, but that famine was for the most part confined to the lower parts of those provinces, and did not seriously affect the upper parts of the provinces; whereas in the year 1860-61, a severe scarcity, almost amounting to a famine, afflicted the upper part of those provinces, and did not affect the lower part. The population of the provinces which was affected by both those famines was comparatively small. I need scarcely allude again to the Bengal famine of 1874, and to the Madras and Bombay famine of 1877. But the general result is to impress me with the idea that excepting certain special parts of India which seem to be peculiarly liable to famine, we have no reason to expect a famine to occur oftener than about once in 100 years in any one tract of country.

1750. That is in any one individual district?—Yes, in any one individual district. The parts of India which seem to be specially liable to famine, and in which it may be expected to occur more frequently than the ratio of periodicity which I have stated, seem to have been first those Northern Circars to which I have alluded; secondly, portions of the North West Provinces; and thirdly, the Bellary country. The first two of those peculiar districts, namely, the Northern Circars and the drier portions of North Western Provinces, are already protected by works of irrigation. The Bellary country is a district which has not been protected, and of the circumstances of which I know nothing, but in respect of which I understand that the geographical difficulties are very great.

1751. Taking the period of the last 18 years, there is a somewhat remarkable succession of scarcities, and in some cases famine?—That is certainly the case, and that remarkable frequency of famines in recent years, although it may possibly be accidental, is in my opinion so serious as to demand very searching inquiry into the question as to whether modern conditions are not such as to render the country more liable to famine than under the old conditions. It is quite possible

Chairman—continued.

Sir *G. Campbell*, M.P., K.C.S.I.

16 May 1878.

that that may be so. To begin with, no doubt under British peace the population has considerably increased, and with the population cultivation has increased. In ordinary times the increase of cultivation counterbalances the increase of population. But, on the other hand, it is my experience that in sparsely populated countries a sparse population has greater resources than a very large population in very fully peopled districts, in time of famine, because where the population is sparse and the uncultivated country is large there are considerable facilities of resorting to jungle berries and jungle fruits, and one thing and another; so that I think I may state it as a matter within my own experience, that those jungly districts do not suffer so severely from famine as the more highly populated districts. Then it is certainly the case, although I am inclined to think there has been a good deal of exaggeration in statements which have been made regarding the effects of cutting down forests, that considerable effect is produced in the country in the long run by the spread of cultivation, by the cutting down of forests, and by the drainage of the country, which causes the natural water supply to run off more rapidly, and to be less completely stored in the natural reservoirs which nature has provided in countries in which the hand of man has not been very active. So that on those grounds I think it is quite possible that the country may become more liable to famines. Then there is another very important view which I think it is necessary to bear in mind. We are very much alive to the fact that improved communications have the effect of enabling us to meet famines in a way in which they never were met before; but we must also remember that there is another view of the question, that those improved communications lead to the export of grain, and a cessation of the old native habit of hoarding grain, which was formerly a very great security against famine. I can speak from my own personal experience. I know parts of the country where every now and again when they have had a very good year the country was perfectly glutted with grain. That was so as regards parts of the Punjab; on the upper part of the Sutlej grain was almost a drug in the market; you could scarcely get anybody to buy it when you had a good season, and an enormous produce of grain, and it was the same in the Nerbuddah Valley, grain was occasionally excessively cheap there. It was the native habit, a habit which no doubt has come down from the time of Joseph, to consider that it was the height of prudence and virtue to store enormous quantities of grain in those cheap years as a provision against bad years. It was the habit of the native grain dealers, and native zemindars and cultivators, and others, to make enormous underground pits, in which in that dry country they could store grain, and keep it for a very large number of years. The consequence was that under that native system the difficulty of a market in the plentiful years being so great, there was an immense hoarding of grain, and a provision against famine, the great store of which came out in the times of famine. Now-a-days there has been nothing so conspicuous in the recent famines as the extent to which the country has been denuded of supplies of grain by the facilities of exportation which such means of communication have afforded. In Orissa it is

Sir *G. Campbell*, M.P., K.C.S.I.

16 May 1878.

Chairman—continued.

actually the case that up to the month of March of the famine year a very active export of grain was going on, that is within six weeks of the time when the country was in the throes of the most frightful famine. The traders had miscalculated. In Bengal during the greater part of the famine, whilst the Government where importing with one hand, the traders were exporting with the other, so that a very great drain took place. I have not the least doubt that on general economical grounds the result of improved communications is a very good result. It is very much better that the cheap grain of cheap years should be brought to market in the quantities in which it is wanted, and that it should be imported in years of dearness and scarcity; but from a financial point of view, it leaves the evil just as great as ever it was, because although it is perfectly true that the means of communication enable you to bring into a famine district in a bad year the grain which is there wanted, still that does not give the people the means of buying the grain. What has happened of recent years is that there being no grain stores in the country where those famines have occurred, the grain being brought in through improved communication, it has been necessary either to supply the grain to the people, or to furnish the means of buying the grain; and therefore, although you may have succeeded more or less, sometimes more and sometimes less in obviating the mortality by famine, you have done so at an enormous expense, and that expense is increasing from famine to famine; therefore it is that there is very great room for question, whether from a financial point of view at any rate, you are not a good deal more liable to very serious and very expensive famines than you were in former days; I think that is a subject which it will be very necessary to work out fully.

1752. You stated that in olden times it was the habit of the natives to store grain, but if a famine occurred the people in the district were still unable to buy that grain, and unless they had the money they would not be able to obtain it?—That is so to a very great extent, but the people themselves, the zemindars, and the cultivators, sometimes stored a good deal of grain. The grain, too, was very much in the hands of their local bankers and money-lenders, who are in the habit of dealing with people who generally get an advance of grain in time of famine and scarcity, to be repaid in time of plenty.

1753. But unless the people generally are more impoverished now than they were in those times, they would still have the money to buy the grain?—No; I do not think they either had the money in former days or have it now, but what I believe to be the case is this, that the grain was then in the hands of their own bankers and traders and money-lenders, with whom they habitually dealt, and whose very trade and profession it was to advance them what they required in time of need, to be repaid with interest in time of plenty.

1754. Do you mean at a lower rate than the Government can import grain or food?—No, I do not say that that would be so, but it was a self-contained system, as it were. The grain was in the hands of people whose profit lay in selling it at a higher rate to the cultivators at a time when they had not money to pay for it, and they were repaid by receiving it back with very high interest in plentiful times; the direct interference of the Government was not so much required.

Chairman—continued.

1755 It not being to the interest of those who had this surplus grain to export it?—It not being their interest to export it.

Sir *Joseph M'Kenna.*

1756. In former days it was the custom to give credit to that class of people?—That was the custom.

1757. But in the present system the vendors of the grain would have no knowledge of them?—No, the people would have to buy grain which was imported from abroad.

Chairman.

1758. The local vendor of grain would in all probability export any surplus stock that he had?—I believe now there are very few surplus stocks; they all go to market.

1759. Was it not the fact that in the Bengal famine, in certain districts there was a great difference, as for instance between Saran and and Champaran, the one was an exporting district in ordinary years and the other was an importing district?—That was so.

1760. And the district which was accustomed to import grain was able to provide itself with food far more easily than neighbouring districts which had been accustomed to export it?—That was so. I alluded to the enormous importation which took place from the North Western Provinces and the Punjab, and it is a further illustration of what I said in regard to the tendency of trade to keep in a conservative manner to its old grooves, that the Saran district always being an importing district was able to supply itself by private trade to a very great extent; whereas, I should say, by contrast, Dinajpore, which had been almost exclusively an exporting district, totally failed to supply itself by private trade.

1761. We are now in rather a transition state in India; there has been an increase of the population they have in the habit of exporting their surplus produce in each year, and the communications are not yet sufficiently expedited and extended to meet the local requirements in time of scarcity?—That is so; but I think that the system of communications has already been carried, or is being carried so far that it may almost be said that we are in a position now in most parts of the country to meet the necessities that arise, or soon will be so.

1762. Is that all which occurs to you in describing the conditions which make the recurrence of famine more prevalent now than in previous years?—I think I have mentioned all that I had to say upon that subject, but I have noted to say a word or two with reference to the question of works of communication as opposed to works of irrigation, as a means of preventing famine.

1763. Before we leave this part of the subject, I should just like to go over the districts affected during the last 18 years by famine, with a view of seeing how far they are now provided against a repetition of such an evil. There was, I think you said in 1860-61, a very serious scarcity in the North West?—Yes.

1764. I assume now that the irrigation system has been so far extended, and the double railway through that province so far completed as to render it comparatively secure against famine?—That

Chairman—continued.

That part of the North West Provinces has always been much better supplied with communication than almost any part of India. I think, so long back as 1860-61, it was the actual fact, that it was entirely supplied by the then existing communications through private traders, and not otherwise, so that there was, I believe, no considerable mortality; all that was required was that the Government should supply means of paying wages for labour to the people; that still more is so now that means of communication are very amply supplied, and I do not think that that district is in any danger.

1765. The next district would be Orissa, where the famine occurred in 1866-7: do you consider the condition of Orissa at all improved now?—It is certainly very much improved. I have not the details exactly as to what has been done to that harbour at False Point since I came away, but we were very sanguine that we had succeeded in doing enough to make that harbour shortly available at all seasons of the year. It certainly has been placed in communication with the Orissa system of canals, and if I am right in supposing that ships can enter at all seasons of the year, and that those canals are so far completed, then I think that Orissa is protected, because you have communication with the country round by sea on the one hand, and you have the canal which gives a very considerable means of saving the crops in a season of drought on the other.

1766. The next famine, speaking of them in chronological order, would be that in the North West and Rajpootana in 1868-69?—That was so, I believe. I have no personal knowledge of that famine or scarcity. I believe it was something like a famine.

1767. The railroad now has been made to Ajmeer, which I suppose would, to a certain extent, protect that district?—So I understand; I believe that when the present railways now under construction are completed, Rajpootana will be very fully supplied with railways. I might almost say over-supplied, in proportion to the population; so that there would be no risk there.

1768. Then, as regards the Bengal famine of 1874-75, that was so completely met that it shows that by a great expenditure you can avert the loss of life there?—That I think was shown, but, at the same time, I should say this: that at one time there was a very great risk that that famine might have been very much larger than it was. We were within a very narrow margin of having a famine, which might have been three, or four, or five times greater than that which actually occurred; a very few showers fell at the very end of the season, which did something to save a good deal of the country; and the cold weather crops germinated and came up in a way which was totally contrary to all expectation; so that now, if we were to take the official reports of our officers about the end of October 1873, and if we gave credit to those reports, as they were then made, it certainly is the case that you would have had an enormously greater famine, and one which, I think, could not have been met by any means of communication which we had at our disposal; and in fact the population is so large that I do not think sufficient grain could have been found, even supposing means of communication had been present; therefore, while the famine which actually occurred was met by the means at our disposal at that time, I have always felt that we were very near having a famine which was beyond our means.

Chairman—continued.

1769. But there can be no means excepting by gigantic expenditure of making Bengal secure against drought, because an ordinary years of rain-fall being sufficient the canals would not pay?—I think so. I think you must look to history, in fact that was what I had noted (and perhaps you will allow me just to go on with this) on the subject of communications as against irrigation. What I wish to say is, that, if we look into the matter historically, I believe no famine ever has occurred which we could not meet by our present means, that there never has been such a scarcity of grain throughout India that you could not meet the necessities of one part of India from another part of India. Take the great Bengal famine of 1770. In this as in other matters I think that distance often leads to a good deal of exaggeration; that famine has been handed down to us as if it was a famine in magnitude, quite beyond anything that we have known in modern times. If the Committee will refer to the actual facts as they were extracted by me from the records of the India Office, and which are contained in the paper which I have just put in, it will be found that in reality that famine was perhaps scarcely greater than some of our modern famines. It was a very severe famine indeed, and it led to a great loss of population in very considerable parts of Bengal, but by no means in the whole of Bengal. The general result showing that it was not a famine which threw the country back for hundreds of years in the way which it had been supposed, will be apparent from some figures which are quoted in page 7 of the report which I have put in, for there it will be seen that the very year following the famine, the revenue rose higher than it ever had been before, and for the next two or three years it continued higher. So that looking at it historically, I believe that there has been no famine so great that we could not have met it with our modern means of communication, and that that Bengal famine of 1770 was one which we could have met with the improved means of communication which we now possess. The famine in 1783 was a very great famine, of which we have no details, but still it occurred in a part of the country in which we have now very great means of communication, and I have little doubt that if a famine of that kind were now to occur, our means of communication would suffice to meet that great famine. I am very confident that none of the famines which have occurred in the present century before the most recent ones, that is to say, the Madras famine of 1825, or the Madras famine of 1833, or the North West famine 1837-38, were so large that we could not meet them with our modern means of communication. Therefore, as a matter of history, I believe that we know of no famine which we could not meet by our means of communication, and by the food resources of India taken as a whole. But on the other hand, just as I said in the case of the Bengal famine of 1873-74, we were within an ace of a very much larger famine, so I believe that it has been so upon two or three other occasions, and therefore I am not prepared confidently to assert that although we have known no such thing in the last 150 years, it is not possible that the next year, or the year after, you might

Sir *G. Campbell*, M.P., K.C.S.I.

16 May 1878.

Chairman—continued.

might have a famine greater than any of which we have hitherto had experience, and one which would be beyond our means of communication and our food resources. Still, seeing that as a matter of history we have no experience of such a thing, I think that we might with reasonable prudence confine ourselves within the limits which history teaches, and that we may believe that if our means of communication are perfect, it only remains to find the money, and we may meet any famines which are likely to occur.

1770. And you would prefer to adopt that course rather than to embark in gigantic schemes of expenditure for the purpose of giving India as soon as possible immunity from drought?—That is my opinion, that our best course is to complete our communications, and as regards works of irrigation, to limit ourselves to those works which are likely to be commercially remunerative.

1771. And you think, therefore, that the certain danger resulting from an enormous expenditure would more than counterbalance the risk hereafter of some great famine occurring which we could not meet?—That is my view; but at the same time I think it is very necessary to remember that India contains a very great variety of climatic conditions. I think there are some parts of India in respect of which there is great justification for the irrigation works which have been made, and that there is a justification for some additional works. I have wished to go over a rain map with a view of making that clear, but I think I had better postpone that until another day.

Mr. *Onslow*.

1772. I believe that Sindh and Rajpootana may be considered as part of the most arid region in India?—Yes; Sindh is absolutely rainless, and it is only irrigated by rivers, and there is a large part of Rajpootana which is rainless, while another part is, I believe, tolerably well watered.

1773. As regards Sindh, there is no record, I believe, for the last 100 years of there being any scarcity or any famine there?—I have no personal knowledge of Sindh. I find from a list supplied by the India Office, that there have been some local scarcities in Sindh, but I should scarcely think anything amounting to famine.

1774. At present have they any irrigation works?—I have no knowledge of Sindh, but I

Mr. *Onslow*—continued.

believe there is nothing but irrigation works, and that the whole cultivation depends upon irrigation works.

1775. And in Rajpootana as well?—No, the greater part of Rajpootana is desert, and in the other part there is a good deal of rain; but I have no personal knowlege of Rajpootana.

1776. At the time of the famine of those districts which you have mentioned, they were not, I believe, under British rule; the northern Circars, for instance?—Yes, they were. I think almost all the famines to which I have alluded were in districts under British rule. I do not think I have touched upon the native States at all.

1777. Are you aware of any famine which took place in any native State, and what was done to mitigate the famine at the time by the ruler of the district?—No, I have no knowledge of any great famine in any native State.

1778. Was it the fact that the hoards of grain which you mentioned in those different States were compelled to be produced by the different rajahs?—In the native times it is very frequent that a pressure is brought to bear upon people who have hoarded grain, and who are unwilling to sell it; that is a process which has been well known in Europe, and is well known in Asia, and I believe it was very common in India in native times.

1779. Under British rule there is no pressure of that kind, I presume?—There has been a good deal of popular pressure; there have been occasions in which riots have taken place; in the famine of 1837-38, there was a good deal of popular disturbance, and a great many grain hoards were plundered.

1780. Still, those hoards of grain might remain intact; if it were not that the owners of them came forward and offered to sell them, there is no reason why they should be distributed over the district?—There are only two motives which would induce an owner to sell them, first the hope of profit, and secondly the fear of being plundered.

1781. And the still greater hope of profit by keeping them back?—The owners keep them back in the hope to get a greater profit, but sometimes they keep them back unduly; and we find that towards the end of the famine there has been grain hoarded back, which eventually has been a loss to the owners.

Thursday, 23rd May 1878.

MEMBERS PRESENT:

Mr. Agnew.	Lord George Hamilton.
Mr. Ashbury.	Mr. Hardcastle.
Mr. Balfour.	Mr. Sampson Lloyd.
Sir George Campbell.	Sir Joseph M'Kenna.
Mr. Childers.	Mr. Ernest Noel.
Mr. John Cross.	Mr. Pease.
Mr. Fawcett.	Mr. Edward Stanhope.

LORD GEORGE HAMILTON, IN THE CHAIR.

Sir GEORGE CAMPBELL, K.C.S.I. (a Member of the Committee); further Examined.

Sir *G. Campbell*, M.P., K.C.S.I.

23 May 1878.

Chairman.

1782. AT the last meeting of the Committee, I think you concluded your evidence as to the prevalence or recurrence of famines; would you now be kind enough to state your view of the climate and conditions which render works of irrigation expedient or otherwise?—Perhaps for that purpose the Committee will allow me to refer to the map, and in the first instance, it may be most convenient that I should refer to the large map upon the wall. The Committee are probably aware that the greater part of the rain supply of India is derived from what is called the south-west monsoon. That south-west monsoon does not blow uniformly from the south-west, but it is divided, and it describes almost a circle, leaving a dry area in the middle, which is a very important feature with regard to this irrigation subject. The south-west monsoon is limited by the Arabian coast, and impinges upon the west coast of India; at Bombay, I believe, it blows nearly due west in the first instance; it is so upon the greater part of the west coast of India; coming from the Arabian coast towards Bombay, the physical features are such that it does not touch Sindh and the parts further north, and the consequence is, that so far as the south-west monsoon is concerned, indeed I may say altogether, this part of India is almost absolutely rainless. The Committee will see on the map that tract described as the Indian desert, and the lower part of the Punjab and Sindh are also nearly rainless; at all events, they have no regular supply from rain whatever. What I may now call the western monsoon, which impinges upon the west coast of India, extends all the way from Surat and Ahmedabad to Cape Comorin. In the northern part the Committee will observe that the great rivers Nerbudda and Taptee break through the Western Ghats; consequently there is an opening made by which the monsoon finds its way up into central India; and by this channel through these breaks in the Western Ghats, all this part of central India is pretty well watered. On the other hand, from the neighbourhood of the Taptee at Surat to about Calicut, where there is a break in the ghats, through which the Madras Railway runs,

Chairman—continued.

there is not a single break in the Western Ghats. The monsoon breaks with very great force upon those ghats, and is to a great degree stopped by them. So much is this the case, that I believe there are places, in fact I have seen them myself, in those Western Ghats, in which there is an average rainfall of between 200 and 300 inches, and 20 miles from that part the rainfall scarcely amounts to 20 inches. The consequence is, that this west monsoon, being for the most part broken and stopped in all this line from near Surat to near Calicut, by the Western Ghats, the supply of rain to the part of India east of this line, derived from the south-west monsoon is very scanty indeed. That tract of country, it will be seen, comprises Mysore, a great part of the Madras Presidency, Bellary, and all that country, and a good deal of the Nizams country. Still more is this the case when we get beyond the Eastern Ghats. The part of the Madras Presidency which is below, or to the east of these Eastern Ghats, receives almost no regular supply of rain at all from the south-west monsoon, and the consequence is, that for the purposes of the chief cultivating season of the year, I believe that this lower Madras country is nearly rainless. I will come to the effect of this presently; but to follow the course of the monsoon: as I have said, it impinges upon the west coast of India from nearly west, but from the time when it reaches Ceylon its course is materially altered; it comes round the Cape Comorin, and then is diverted to the north, and blows nearly due south to north in the Bay of Bengal, leaving untouched that part of the Madras Presidency, which is also, as I said, untouched by the western stream of the monsoon. This southern stream of the monsoon reaches Bengal, Calcutta, and the country thereabout, almost as a due south current. It waters well the whole of Bengal proper, and the whole of Orissa, and falls in enormous quantities upon the eastern side of the Bay of Bengal; but the supply which is rendered to the northern coast of the Madras Presidency from Ganjam to Masulipatam is very scanty and very uncertain; therefore it may be said that the south-west monsoon waters the whole of the west coast of India, that it

Sir *G. Campbell*, M.P., K.C.S.I.

23 May 1878.

Chairman—continued.

it affords a precarious supply to a portion of the northern district of Madras, from Masulipatam to Ganjam, avoiding altogether the south-eastern districts of Madras, and that it well waters the whole of Bengal, of British Burmah, and Assam. The supply in the east is so enormous that we have a place here where the monsoon stream of rain meets the hills, where the average rainfall is from 600 to 700 inches, at a station called Cachar, where there is a rainfall register, and where as much as 900 inches have been registered. In the plains of Bengal, I think I may say that the average rainfall is from 60 to 100 inches. At Calcutta it is from 70 to 80 inches, I think, and in Orissa about 70 inches; while in the eastern districts the rainfall is 100 or 120 inches.

But another diversion of the monsoon stream of air takes place when proceeding to the north from the Bay of Bengal, it reaches the Himalayas. It is there diverted again to the westward, and the consequence is that the greater part of the most populous portion of the Gangetic valley receive its rain supply from what is called the south-west monsoon, not from the south-west, but from the east or the south-east. That supply of rain being diverted by the Himalayas proceeds up the valley of the Ganges, and about Agra, Gwalior, and Saugur, it meets the stream which is coming up from Surat and Baroda by the other channel, thus, as I have explained, making a sort of complete circle, but leaving dry an area in the centre of that circle. Thus we have in India two dry areas, so far as the south-west monsoon is concerned: first, Sindh and the lower Punjab, which is avoided by the south-west monsoon altogether; and secondly, this part of the Madras Presidency, which is shut off from the monsoon by the Western Ghats on one side, and which does not get it upon the other side. Perhaps the Committee will allow me now to refer to the rain map which is published at page 32 of the Statement of the Moral and Material Progress and Condition of India for the year 1872–73. The main and almost the only regular and periodical supply of India is for the most part, except a very limited district, entirely confined to this south-western monsoon, which, as I have said, in a great part of India becomes a south-eastern monsoon; but there is a comparatively very small part of India which is, I believe, better watered by a sort of reaction of the other monsoon, which is known as the north-eastern monsoon, which strikes a limited portion of the Madras Presidency. The Committee will find in this rain map to which I refer, immediately about the town of Madras, a small tract with an average rainfall of above 40 inches. That indicates the centre and chief force of the north-eastern monsoon, which is a very short monsoon, and occurs about the end of October and the month of November, and that small tract of above 40 inches is surrounding the town of Madras. That north-east monsoon does more or less penetrate a certain way into the peninsular part of southern India. But there is this effect of the concurrence, as it were, of the two monsoons, that you have on the east coast of the Madras Presidency, the tract which I have already mentioned between Masulipatam and Ganjam, a tract which receives a somewhat precarious supply from the south-west monsoon, and also a somewhat precarious supply from the north-east monsoon, lying as it does between the

Chairman—continued.

two monsoons; and, consequently, as it depends upon two supplies, both of a precarious character, it has always been a part of India especially liable to climatic disturbances, and especially liable to famine. Moreover, you have also, as the Committee will see, a large tract in the centre of the peninsular, which is coloured in the rain map nearly white, and described as a tract in which the rainfall is less than 30 inches. I believe that that is also a tract which looks to receive a somewhat precarious rain supply from the two monsoons, lying as it were between the two, and that also, like the other tract on the coast, is one which is peculiarly liable to climatic disturbances and to famine, comprising as it does the Mysore and Bellary districts and other adjacent country.

1783. What are the rivers which run through this tract of country?—For the purpose of considering the river system, and especially the effects of inundation and irrigation, it is necessary to remember what I have already mentioned to the Committee, that the north-east monsoon is a monsoon of a very limited duration, and which comes late in the year, and also it is very important to remember that during certainly the best part of the cultivating season, that is to say, throughout the months of June, July, August, September, and generally the greater part of October, the country which is afterwards affected by the north-east monsoon, is nearly rainless. Therefore, for the purposes of inundation and irrigation, we may almost put out of sight for the present the north-eastern monsoon. What happens is this, and if the Committee will look at the map they will see that in this peninsular portion of southern India, there is a succession of great rivers, which have their sources in the Western Ghats, and which run down to the Bay of Bengal on the other side. The sources of those rivers are very abundantly supplied by the rainfall of the Western Ghats, which I have described as amounting to, I believe, something like 200 or 300 inches per annum, almost the whole of which is concentrated upon the three or four months of the monsoon season. Consequently, the driest tracts of India, the dry tract of southern India, to the east of the Western Ghats, and I may also add the Punjab and Sindh, which are similarly supplied from great rivers, having their sources in the Himalayas, both those dry tracts, at the driest season of the year, are to a great extent supplied with water by the great rivers, which have their sources in the rainy part of the country, which are at their very fullest at the season of the year when the countries through which they flow are themselves driest. That is a circumstance which must be chiefly born in mind when we come to consider the advantages of irrigation in those particular localities.

1784. Will you have the kindness to state what the rivers are which rise in the Western Ghats and flow to the eastward?—The rivers which rise in the Western Ghats are the Godavery and the Kistna, consisting, as the Committee will see, of several branches, and another river called the Cauvery. I do not know the names of the smaller rivers, but I think they were mentioned the other day by Colonel Crofton. Those are all rivers which have their sources in the Western Ghats, and which are running at their very fullest at the best cultivating season, at a time when the countries through which they flow

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Chairman—continued.

are very dry indeed. In the other dry tract, the Punjab and Sindh, we have the Indus, with its great tributaries the Sutlej, the Beas, the Ravi, the Chenab, and the Jhelum, all of which are running very high of water at the hot season of the year, at a time when the lower countries of the Punjab and Sindh have no other water supply.

There is another feature in connection with this rain supply which very materially effects the matter, and that is the great difference in respect of the character of the crops which are grown, a difference which depends almost entirely upon the supply of water. In the countries which are very moist, and where the supply of water is very large, the population mainly depends upon rice cultivation. I may say in many parts of the country they almost exclusively depend for their ordinary food upon rice cultivation. The countries which depend upon rice are first the strip all round the coast, very narrow on the west coast, and a broader strip upon the east coast, which, latter, as I shall show presently, is abundantly supplied, not so much by rain as by irrigation; and again, almost the whole, I may say the whole, of Bengal proper, and the greater part of Behar. I need hardly mention Burmah, which is a very moist country, and which produces enormous quantities of rice. The Committee are aware that the province of Behar lies nearly to the west of Bengal proper. A great part of that province, as I have said, is a rice province, but a part of the province of Behar, the whole of the North Western Provinces and the Punjab, the greater part of central India, and almost the whole of what is called the Deccan, that is to say, the higher part of the peninsular, of Southern India, are countries the cultivation of which is of a wholly different character. In all those countries, comprising a large part of India, the rice cultivation is merely subordinate and local, and altogether of an unimportant character, and the population depends principally upon other grains, which are usually known as dry grains. There the millets known as *jowari* and *bajari*, are cultivated in the hot and rainy season, and then wheat and barley, and other such grains which are sown in the autumn, and which growing throughout the cold season, are reaped in the spring. The difference of cultivation causes a very material difference with regard to this question of dealing with famine, because in consequence of the difference in cultivation, there are, I may say, two entirely different kinds of famine in India. There is the rice famine, which affects some provinces; and there is the famine of the dry crops, which affects other provinces. I should like to explain why these two kinds of famine are, in many of their aspects, somewhat different The reason is this: rice is a cultivation which depends almost entirely upon water, and it is absolutely necessary that the rice plant should be kept almost growing in water for a certain part of its growth. In the early part of the season we generally, I think I may say almost always, have enough rain in those rice countries for the supply of the rice plants, which are less liable to failure on this account, that in the greater part of Bengal the rice is not sown broadcast like many other grains, but is planted in seed-beds in places where a supply of water can be absolutely ensured, and is then dibbled out by hand later in the season, about the month of August,

Chairman—continued.

Sir *G. Campbell*, M.P., K.C.S.I.

23 May 1878.

in the fields where the crop is expected to be reaped. So long as we have water enough, and we always have had water enough, to plant out the rice crop in the month of August, once that rice has taken root it is likely to come to maturity, provided only we have sufficient rain in the end of September and October at the end of the monsoon. That is absolutely necessary to the perfection of the rice crop; but it has happened upon several occasions; it was so in Orissa in the year 1865, and it was so in Bengal in the year 1873, that the rice crops, which up to that time were entirely flourishing and promising, were almost utterly destroyed by the sudden failure in the rains in the month of September of those years. The consequence is that a rice famine is what I may call of a very sudden character, and also in many respects of a much more severe and extreme character for the time than the famines which occur in other parts of India, because, as I have said, you may have a crop which up to the beginning of October is perfectly flourishing and promising, but which is absolutely killed by a failure of rain at that particular season of the year, and you may in the course of a very few weeks be plunged from the utmost prosperity and the utmost promise into absolute failure and absolute famine. Also those rice famines, although of shorter duration, have been generally much more acute than the other famines, because, as I have said, the population of the rice countries more exclusively depend upon one grain than the population of the other parts of India. I think that is the character of those rice famines which have occasionally occurred. On the other hand, in the drier countries which do not expect, do not receive, and do not adapt their cultivation to a very large rain supply, you have a much greater variety of crops; you have crops which are not easily killed by a partial or temporary cessation of the rains in those countries, and it has generally happened that a famine comes in as it were much more gradually, being the result of a much longer duration of dry weather. In most cases, I think I may say, that very great famines in those countries have been the result of more than one exceptionally bad season, and have been generally much longer in their duration, although not perhaps at any one period so acute in their intensity as the rice famines which I have described. With regard to this question of the two kinds of famine, I should just like to point out that the province of Behar, to which I have already alluded, is a country which seems to be peculiarly liable to rice famines, for this reason, that it is on the very border-land of the rice country, and it is the last country where rice is habitually cultivated, and the supply of rain is so small as to leave little margin for rice cultivation, and the consequence is that on that border-land of rice, as it were, they are peculiarly liable to rice famines.

1785. With regard to an answer which you gave a few minutes back with respect to the number of rivers in Madras which derive their sources from the Western Ghats, if you look at the map on page 49 of the Statement of Moral and Material Progress, you will see that there are only three rivers in the Presidency of Madras which rise in the Western Ghats, namely, the Cauvery, the Kistna, and the Godavery?—I always supposed it to be so, but I think

Sir *G. Campbell*, M.P., K.C.S.I.

23 May 1878.

Chairman—continued.

Colonel Crofton the other day mentioned one or two small rivers, the Pennair, and some others, I think, as rising in the Western Ghats. I am not quite sure whether he was correct or not.

1786. But assuming this map to be correct, with the exception of those three rivers, all the other rivers flowing eastward in Madras, would rise in the district which you describe as very sparsely watered, and consequently their supply would be dependent upon the rainfall?—That would be so, supposing that they do not rise in the Western Ghats.

Then I was about to explain that in consequence of the physical features I have described, there are two entirely different styles and kinds of irrigation in India. There is what I may call the high-water irrigation, and the low-water irrigation. The high-water irrigation is that which is derived from rivers at the time when they are fully in flood, and that remark applies both to the rivers of Southern India, and to the Indus and its tributaries watering the lower Punjab and Sindh. It is a physical feature which I believe is almost universal, that rivers have a tendency to raise the beds of their courses, and they often run in beds somewhat higher than the country to the rear of them on either side. The consequence is that when those rivers are full to the brim, you can with great facility lead off the water on to the neighbouring countries, and supply those countries with flood water without any very large or very expensive works. That is the case on the Nile, and that is also the case to a very considerable extent in the Lower Punjab and Sindh, as regards the Indus and its tributaries. But then in the rivers of Southern India, you have also, by engineering art, an advantage which you have not yet obtained in the Nile, because what has been called the barrage of the Nile has not been so successful as the great Indian works have been. In India you have the native success in first making a work of this kind on the river Cauvery, and our engineers have subsequently made such works upon the Kistna, the Godavery, and on the Mahanuddy, in Orissa. You have then this advantage, that the engineers have been able to establish a kind of dam at the point where those rivers issue from the hills, and enter upon the large alluvial deltas which are always found at the mouths of those rivers. By establishing this great dam, called in the Madras language an anicut, you are able to control the water. You have great waste weirs by which the surplus water escapes, and you are also able to divert the water in any particular direction which you may desire. As this head, this central point of those deltas, is almost invariably higher than the greater part of the delta itself, you are enabled from this central head to carry out your canals, and to radiate them, as it were, in the shape of a fan from your central point to the various parts of the delta which lie at a lower level as compared to your head work. In this way you have a double advantage; first, that you are able to control your water and distribute it as you like; and secondly, having an immense supply of water brimming over at this season of the year, you are able, from this central point of the fan, to make any number of channels to distribute almost any quantity of water. That is the great advantage which they have in these rivers of Madras, which bring down

Chairman—continued.

their full supply at the season of the year when the country to the east is dry, and that I believe is the great secret of the success of those Madras irrigation works; that is to say, that upon the Cauvery, the Kistna, and the Godavery, you are able to supply, at a not extravagant rate, enormous quantities of water at a time when those countries have no natural rain supply, and when, therefore, the people are most ready and willing to take the water, and feel that they benefit immensely by it. There can, I believe, be no doubt whatever that the old native works supplemented by our engineers have been most successful in this respect in the Cauvery delta, and I believe that, to the honour and credit of Sir Arthur Cotton and his school of engineers, it may certainly be said that although, owing to the revenue system which amalgamates the water rates with the land revenue, no man can say exactly what the profit is, still I think it is generally admitted that the new works designed and carried out by Sir Arthur Cotton and his school of engineers, have been extremely successful upon the deltas of the Godavery and Kistna, and they would no doubt be equally successful in Orissa upon the mouths of the Mahanuddy, if it were not for the circumstance which I have mentioned, that whereas these Madras districts have an extremely precarious, scanty, and uncertain supply of rain from the south-west monsoon, Orissa is usually very amply supplied from the same source. In the Lower Punjab and Sindh, it is also the case that you have inundation canals, by which the water is led over a great tract of country, without any permanent or very large works, and at a comparatively small expense. That is the first kind of irrigation; but in Northern India, especially, you have another kind of irrigation which I have called the low-water irrigation. The circumstances of that are these: if the Committee will look at the rain map they will find an indication of that which I think I have already described, namely, that when the south-west monsoon turns in its course and becomes a south-eastern current, it proceeds up the valley of the Ganges; as it proceeds it clings to the foot of the Himalayas, as it were, and gradually tails off; so that whereas the greater part of the North Western Provinces are tolerably well watered, as you get towards Delhi the well-watered tract becomes narrower and narrower, and as you get up into the Punjab it becomes very narrow indeed. Throughout the greater part of the North Western Provinces the supply is so considerable that you ordinarily do not stand in need of irrigation during the monsoon season from June to October; but then a very great part of the cultivation of that country consists of wheat and barley, and other dry grains, which are principally grown in the cold season, when you have little natural water supply; it is then that the well irrigation which I described comes so largely into play, and it is to supplement and add to that well irrigation that the canals of Northern India have chiefly been made. The physical circumstances are such, that those canals are very much more expensive, and supply a very much smaller quantity of water, than the deltaic irrigation canals which I have alluded to as the first kind of irrigation. What we find is this, that you are obliged to take your water supply from the point where these great rivers issue from the Himalayas; but you have first

this

Chairman—continued.

this circumstance, that the monsoon, clinging, as I have said, to the Himalayas, usually for the first 50 or 60 miles you come through a well-watered country where there is not very much want of irrigation, and where the canals are apt to lead to unhealthiness. And you have this additional difficulty, that generally that country is very much broken, and intersected by a great deal of drainage, so that you are obliged to go to a very great expense on the upper portion of your canals (I think the expense of the first 50 miles of the Ganges Canal was very large indeed), that is in carrying your canals over the dry water-beds of the country, and over the undulations; and the difficulties which exist are such that it limits the size of your canals. The consequence is, that those canals are, for the most part, designed not to carry great inundation supplies of water, which are not wanted in that country at the inundation season, but only to carry the lowest cold water supply which is obtained when the climate is at the driest, and when you are in most need of it for the cultivation of your wheat and your barley, and other similar crops. The result then is, that those northern canals are very much more expensive than the other canals, that they carry a much smaller quantity of water, and that although they supply a very valuable cultivation they have never paid so well, and I am afraid that they are never likely to pay so well as inundation canals, which have those very exceptional advantages that you have a very abundant supply at the time when you have got no natural rain supply. Therefore I think it is that some canals do pay well, whilst others do not pay, and those which pay well are notably the canals of those Madras deltas to which I have already alluded.

At the same time I wish to ask permission to denounce, in the most emphatic words of which I am capable, the attempt which has been made to represent the canals of the Cauvery delta as paying, I think, 87 per cent. upon their capital. I think that the entire fallacy of a statement of that kind must have been made apparent to the Committee by the evidence of Colonel Crofton, for Colonel Crofton told us that, as a matter of simple statistics, the quantity of land watered, and well watered, from those Cauvery canals, was almost as large when we took it over from the Native Government as it is now; that is to say, that at that time it was about 700,000 acres, and now it is, I think he said, between 700,000 and 800,000 acres. What I apprehend is that our engineers, no doubt excellent engineers, did extremely good service to the State when they patched up those irrigation works when they were likely to break down, and they improved them very much, I have no doubt; but still the expenditure which was incurred on saving those works from ruin, which time would otherwise have brought about, and in maintaining and improving them, is not a capital to which you can attribute the whole revenue derived from those canals, which was in fact a revenue handed over to us by the Native Government who preceded us, and which is said to be something like 2,000 years old. At the same time I have admitted that although figures cannot be given, although the information does not exist in a shape which will admit of precise figures being given, I am led to believe that the Godavery and the Khistna works are new works that are profitable to the State and to the people.

Chairman—continued.

Sir *G. Campbell*, M.P., K.C.S.I.

23 May 1878.

1787. You have alluded to the works in Madras, at the mouths of those great rivers, have there been any works constructed inland at all similar to those of the north-west and the Punjaub?—I have no personal knowledge of that subject. I gather that the object of the Madras Irrigation Company was to construct works of that kind, but I have never seen them, and I have no personal knowledge in regard to them.

1788. The Madras Irrigation Canal runs through the district of Kurnoul, does it not?—I believe so.

1789. But you have never visited it?—I have never seen those works.

I was about to describe to the Committee my view of the financial result of some of those works of Northern India which I have seen, and in respect of which I think the Committee have been told by the engineering witnesses that the Ganges Canal may be taken as a test work. Perhaps I may be allowed to examine the figures which have been given as respects the Ganges Canal, taking those figures as they were given to the Committee by the engineering witnesses, who have full knowledge of them. General Dickens and Colonel Crofton, I think, told the Committee that the Ganges Canal now being in full operation, and I believe the whole of its water being utilised (so that there is not likely to be very much further extension, except by the expenditure of additional capital, on further canals which are now being made), returns, according to the engineering witnesses, about 6 per cent. upon the capital expended; but I believe one of those witnesses admitted to the Committee that the account, showing 6 per cent., is made up in a way which, I think, can hardly be justifiable in a commercial point of view, if the object is to know whether those canals really have paid the Government; because it is an undoubted fact that all the time during which those canals were under construction, and during the years when they certainly did not pay, the Government was in debt; the Government was borrowing money, and the Government was paying interest upon that money; and, therefore, when you come to inquire whether those canals have or have not been profitable to the Government, you certainly must take into account the money which was expended by the Government upon paying interest during the time when the canals were under construction and were not self-supporting. General Dickens, I think, admitted, that by adding the simple interest for the period during which the Ganges Canal was unproductive, the return upon the capital will be reduced to about 4 per cent. instead of 6 per cent. But then I must also submit that if you want to get all the cost to the Government, you must add compound interest, because it is the fact that the Government not only paid interest upon the money which they borrowed, and which they used to construct those canals, but also upon the money which they used to pay the interest when they did not get it from any other source. The interest was, as a matter of fact, paid again, and therefore, as a matter of account to ascertain the real cost to the Government, you must add compound interest; so that, I think, I may say that if you add compound interest, as representing the real cost to the Government, your return, as now rendered by the engineers, will probably be reduced to something like 3 per cent. upon the capital.

Sir *G. Campbell*, M.P., K.C.S.I.

23 May 1878.

Mr. *Fawcett.*

1790. Has not a calculation been made to show, according to your hypothesis, that the return is, as nearly as possible, 2½ per cent. ?—I am not aware that that is so; but of this I am aware, that up to a recent period, the Government published an account showing the simple interest, and the return on the capital exclusive of simple interest, and also the return inclusive of simple interest, the one being about 5 or 6 per cent., and the other about 4 per cent.

1791. Upon calculating it, I find it, as nearly as possible, 2½ per cent., taking the Government figures?—My impression is, and I think the Committee have been told that up to the other day in this account, simple interest was shown, but in the new form of account it has altogether been excluded, and it is the intention of the Government of India in future to exclude it, and to show only the capital account exclusive of interest, and a return calculated upon the capital account so shown.

Chairman.

1792. In the Finance and Revenue Accounts, as presented to Parliament, compound interest was never calculated ?—No, I believe not, it was simple interest only.

1793. And in the proposed new form of accounts they would take just the same basis of calculation as the old ?—No; I have understood that the new form of account is to exclude simple interest, and to take only the capital actually expended without interest at all.

1794. But in the old form of revenue and finance accounts it was simply calculated as the loss of the year, and not the loss of the preceding year ?—I understood that it was the accumulated simple interest, and without any compound interest being added.

1795. As the cost of public works was charged to the revenues of India, it was simply the difference in that year between the net receipts from those works and their working expenses? —I have no doubt that the Noble Chairman understands the account better than I do. My calculation was this, that according to Colonel Dickens' showing, without interest the return is 6 per cent, with simple interest the return is 4 per cent.; and I assume that if the compound interest be added the return may be about 3 per cent.; but that 3 per cent. includes not only the direct return from the water rate, but also what is called the indirect revenue, which is supposed to be received from the improvement of the country, and the consequent increase of the land revenue; that would be included in the interest, which I calculate to be about 3 per cent. I will come to that question of the indirect revenue afterwards; I will only just say here that I am inclined to believe that there is a good deal of fallacy, and exaggeration, and uncertainty in regard to the calculation of the indirect revenue, and you must, on the other hand, if you calculate the indirect advantages, also calculate the indirect disadvantages, in the shape of exhaustion of the soil, and unhealthiness, and so on. As regards this Ganges Canal, I knew that country very well indeed before the Ganges Canal came into operation; that country called the Doab of the North Western Provinces, I have seen something of it, and have heard a good deal more of it, since the canal came into operation, and I confess that I am very much inclined to doubt whether upon the whole it can be

Chairman—continued.

confidently said that that canal really has been a benefit to the country, or at all events a benefit commensurate to the large expenditure which has been involved in that canal; because it must be remembered that although I at once admit that in a desert country which is turned into a cultivated country, the benefits of irrigation are undoubted, still it must be remembered that this doab of the North Western Provinces, before the Ganges Canal came into operation, was not by any means a desert, but was on the contrary one of the most populated, and one of the most productive, parts of all India, bearing a population probably larger than any part of Europe, equal to, if not exceeding in density, that of Belgium, prosperous and increasing, and with considerable indigenous means of irrigation. Therefore you cannot say that you have turned an inferior and unproductive and unpopulated country into a country which is cultivated and prosperous. It may be a question whether the cultivation is now immensely superior to that which it was before, but it is certainly the case that it is merely a matter of degree, as you had a country which was populous and prosperous, and productive and healthy, and you now have a country which is, it may be, more prosperous and productive, but which is certainly not more populous, because it is very much less healthy than it was before. That being so, seeing that the revenue derived from the capital expended upon the Ganges Canal is not what I should consider commercially reproductive, seeing that if you calculate it, including the alleged indirect revenue, it is only 3 per cent.; but if you exclude that indirect revenue, which I think it is necessary to exclude in order to make just calculation, taking the matter commercially, probably your return would not have been more than 2 per cent.; seeing that you do not get, as I think, a sufficient return for your capital, and seeing that the country, if it is in some degree more productive, is certainly less healthy, I think it is quite a matter of doubt whether, if we could go back and get our money again and restore the country to the position in which it was before, it might not be better to be without that Ganges Canal than with it. At the same time I do not by any means express a confident opinion that it is so; I only say that having seen a good deal of the country at both times, I think it is quite a matter which is open to doubt, and to a question of that kind; and assuming that the canal has really been a source of great benefit to the country, certainly I do not think that it has been productive to the Exchequer.

1796. But it has effectually secured that part of the north-west against drought, has it not?—It has done so to a certain extent, I have no doubt, but I was led to suppose that, in very dry seasons, the quantity of water in the Ganges Canal is so far diminutive that it could not effectually water the whole country, which is now covered by irrigation channels.

1797. You have been speaking of it simply as a commercial transaction?—Simply as a commercial transaction first, and secondly, as regards the general prosperity, and benefit to the country. I am also very much influenced by this as regards famine, that I have the opinion that the means of communication in that part of the North West Provinces are now such that any famine that is likely to occur once in 30, or 40, or 50 years, could

Chairman—continued.

could be met by means of the importation of food, even if you had no canal at all.

Mr. *Fawcett.*

1798. You lay great stress upon railway communication?—I do lay very great stress upon it.

Mr. *Ernest Noel.*

1799. How was that district supplied with water previous to the formation of the Ganges Canal?—By wells, as I explained to the Committee the other day.

Mr. *Balfour.*

1800. We have had it in evidence, have we not, that with proper arrangements that unhealthiness to which you have referred could be avoided?—That fact was broadly stated by two of the engineer witnesses; and the other day from another point of view, I stated very strongly my opinion, that there are no sufficient grounds for that statement.

Mr. *Fawcett.*

1801. The unhealthiness has not as a matter of fact been cured; it is only hypothetical that it may be?—It has not been cured certainly. Then the state of things as regards irrigation it seems to me in this: that considerable parts of the country which are most liable to the most frequent famines, andwhere you have the greatest facilities for irrigation, have been already secured by irrigation works, that is to say, the lower portions of the Madras Presidency, and a considerable portion of the North West Provinces, and a small portion of the Punjab. Still you have a large proportion of rainless or nearly rainless tracts, in respect of which you have not yet succeeded in supplying a sufficient means of irrigation. I mean the greater part of the lower Punjab and Sindh, and a great part of the high districts of southern India, the country about Bellary, and so on.

Chairman.

1802. What have you to say with regard to future projects?—I have to remark, with regard to future projects, that it seems to me that the expense of those projects is continually increasing; we are told that the Godavery and the Kistna works were made at a very moderate expense; we know now that the Orissa works which are not dissimilar in character (I suppose the Orissa and Midnapore works may be taken together), have been continually increasing with regard to the estimated charge. From 2,000,000 *l.* they have gone up to 4,000,000 *l.*, and now there is an estimate, I believe, for 6,000,000 *l.*; I also find with reference to the projects which were proposed for watering North Behar and Oudh, that those projects were enormously expensive; canals to water these districts were proposed, each of which was to cost no less than from four to six millions sterling. It was very much on account of the expense that the project for watering North Behar was abandoned, because I have stated to the Committee that North Behar, being a sort of border country, in respect of rice cultivation, is peculiarly liable to failure; and if irrigation could have been supplied at a moderate cost, and without great unhealthiness, I think it would have been very desirable that it should have been so supplied; but, as a matter of fact, the projects turned out to be so expensive that I think that they were wisely abandoned. And seeing the great difficulty of the questions which arise with regard to the unhealthiness attaching to those canals, and the exhaustion of the soil, my own opinion is that the construction of canals in future should be confined to those cases in which there is really good reason to believe that the canals will pay, from a strictly commercial point of view.

Chairman—continued.

1803. In fact you would, I suppose, argue that if a canal did not pay, it was a strong presumption that it was not wanted in the district?—That is my view.

Mr. *Sampson Lloyd.*

1804. Do you think that any of the canals now pay?—I have not the least doubt that the Cauvery Canal is an extremely paying work, although what the capital employed is, it is impossible to say; I have also, I think, stated to the Committee that I have very little doubt that the Godavery and Kistna works are also paying works, but I am afraid that I do not know any other new work in respect of which I could say that it does pay. In the case of the Ganges Canal, and other new works, there is doubt about their paying, and great unhealthiness has attended them. The Western Jumna and the Eastern Jumna Canals being old native works taken over by us, are undoubtedly of a paying character.

Mr. *Fawcett.*

1805. You would generally endorse the statement which was made by Lord Salisbury, when he was Secretary of State, that so far as he could discover, there was not one single irrigation work which was entirely of British construction which showed the result of a clear balance sheet?—Except the Godavery and the Kistna.

1806. His statement did not even exclude those, but adding those two, you would accept that statement?—I would accept the statement, except as regards the Kistna and the Godavery; I may say that I have no personal knowledge, but from all I have been able to learn, and I have inquired very much upon this subject, having had so much responsibility for the irrigation works in my hands, I have been led to believe that undoubtedly, although we cannot say how much they pay, the Godavery and Kistna are paying works.

Mr. *Sampson Lloyd.*

1807. Assuming that a given district, say of 100,000 or 200,000 acres, does not pay, does not it protect also a very considerable district round, perhaps twice or three times its size, from the effects of famine, as I think we have had in evidence from Colonel Crofton?—Not altogether. It protects the district which is actually irrigated no doubt from famine; but as respects the district beyond, it seems to me that it only protects the district beyond, exactly in the same way in which the means of communication protect it, that is to say, there is grain which may be supplied to the adjoining districts, provided those adjoining districts, being themselves subject to the scourge of famine, have money to pay for the grain. Therefore the effect is exactly the same as the means of communication, which bring grain from more distant provinces.

Mr. *Fawcett.*

1808. Supposing, for instance, that a famine occurred

Sir *G. Campbell*, M.P., K.C.S.I.

23 May 1878.

Mr. *Fawcett*—continued

occurred in a district (and your evidence is that on an average a famine occurs, say, once in 100 years), although by irrigation works that district may be saved from famine, yet on the other hand, is it not your contention that there is a most serious disadvantage to that district during the 100 years between which the famines occur, in being rendered much more unhealthy?—It appears to me that there is very much reason to believe that that is the fact with reference to many parts of the country.

Chairman.

1809. As regards those great irrigation works which have been undertaken by the Government, should you say that they have been undertaken on the assumption that they would be financially remunerative?—They have generally been undertaken in the Public Works Department, and I cannot personally speak as to that fact. Certainly it is so with respect to the principal canals with which I have been officially concerned, with this exception, that as I stated to the Committee the other day, when the Government of India wrote down to the Government of Bengal, showing that the Soane Canal would be remunerative, I told them very distinctly that their figures were worth nothing at all, because we had not got the information; but they nevertheless proceeded to make the canal, I suppose believing those speculative figures, which I think were more or less unreliable.

1810. It is only, therefore, when the primary reason for undertaking a canal has failed, that the advocates of irrigation point to the indirect advantages which may be derived from their construction?—The word indirect may be used in two ways: first, there is an indirect advantage which is supposed to be reaped in the shape of land revenue; that is one indirect advantage which they have always claimed; and then there is an indirect advantage in the shape of saving the country from the risk of famine, which is a second indirect advantage which is claimed, and which is not so immediately taken into account.

Mr. *Fawcett.*

1811. You stated, did you not, that a speculative estimate was sent down from the Public Works Department to the Government of Bengal with regard to the Soane Canal, and that your reply was that those figures were speculative, and, according to your calculation, the canal, if constructed, would not pay?—No, I did not say that exactly; I said that we had not got any statistical data; I did not say that the work would not pay, but I said that the figures showing that it would pay were absolutely worthless.

1812. After receiving that remonstrance, that the data were speculative, was the canal ordered to be constructed?—I did not remonstrate, I merely warned the Government.

1813. Upon those speculative data did they proceed to construct the canal?—They proceeded to construct the canal, but whether relying upon those speculative data or on the general belief that the country was suitable for a canal, I cannot say.

1814. In what year was that?—It must have been about the year 1870 or 1871.

1815. It was after the classification of the

Mr. *Fawcett*—continued.

Public Works Extraordinary, was it not?—I think so.

1816. The object of that classification was, was it not, that extraordinary expenditure should be devoted to works, which commercially were supposed to be reproductive?—I am not quite sure whether that rule had been strictly laid down; I know that it was again, in an unmistakable form, laid down after I became a member of the India Council in the year 1874.

Chairman.

1817. What is your opinion upon the subject of indirect revenue?—I am very glad to say a word with regard to this question of indirect revenue, which is supposed to be derived from an increase of the land revenue; I think it will be very evident to the Committee, from what they have already heard of the nature of that indirect revenue, that it is precisely similar to the case of an increase in the rent of lands, owing to a railway being made through a part of the country in which those lands lie. It is undoubtedly the case that some additional value is given to the land, and that the rent of the land is increased by the railway coming into the country, but I think the Committee will feel, and every man who has had to do with land will feel, that it is utterly impossible to express in figures the exact increase of value which is due to railways, because there are many other causes operating at the same time, and it is impossible in the general increase of rent over the country, to distinguish the exact amount which is due to the railway, and the exact amount which is due to other causes. The case is precisely the same with regard to those canals; undoubtedly if you turn a desert into a cultivated country, and you derive a land revenue from that ground, which you did not derive before, so far there is a clear gain; but in respect of districts of the character of those North Western Province districts, which were before paying and prosperous districts, which are understood to be now more paying and more prosperous, I should say that it is quite impossible to distinguish between the amount of the additional revenue or rent which is due to canals, and the amount which is due to other causes, and notably to the means of communication, because you must remember that since those canals have been introduced there has been an immense improvement in the means of communication, and that you have had means, as I last week explained to the Committee, of carrying your grain to market in a way which you never did before. As a matter of fact, I believe, if you look at the prices current, you will find that the average value of grain is probably nearly double now what it was a generation ago; therefore there was very great reason to expect that your revenue should increase quite independently of the increase indirectly due to the canals. Looking to the facts, I should myself be inclined to take a different view, because when I look at the land revenue of the North Western Provinces as it stood 30 or 40 years ago, and as it stands now, when I look at the immense improvement in the means of communication, in the prosperity of the country, and in many other ways, I should certainly have expected the land revenue to have increased almost more largely than it has increased. As a matter of fact I do not think it would be found that the land revenue of the North

Chairman—continued.

North Western Provinces in the last 30 or 40 years (it having been subjected to a new settlement at the end of the previous period of 30 years) has increased more than 20 per cent., or certainly not more than 25 per cent. at the very outside; but I really think not more than 20 per cent. I have not very exactly studied the revenue statistics of the canal districts, but my impression is that it will not be found that in the course of the last 40 years any of those districts have increased as much as 50 per cent. in their land revenue; therefore I think it is not only a very speculative question whether it is to those canals we really do owe the increase of land revenue, but also, looking at the amount of increase which has occurred, it is very doubtful whether you can fairly attribute a large amount to that source; at any rate this I do very confidently say, that whatever is attributed to that source it is a mere speculative estimate, and that you cannot fix it precisely in figures. You must recall other points of the history of the country, and look to the general benefit to the country. You must look at the broad question whether the country as a whole has been benefited, and whether it has been at a disadvantage in respect of unhealthiness and otherwise, which counteracts those indirect benefits.

1818. In your view any comparison between the financial results of railroads and irrigation must be fallacious, inasmuch as the indirect results are credited to irrigation, and none to railroads?—That is absolutely so.

Then as respects the exhaustion of the soil, with regard to which a great deal has been said, I have not the slightest doubt, for reasons which I have already submitted to the Committee, that in those countries of northern India, the North West Provinces, and other countries where you grow wheat and barley and such exhausting crops, the excessive stimulation of the soil, which is due to a too large supply of water without a corresponding increase of manure, has led to a very great exhaustion; but I think it necessary to state that I believe in this respect there is a very great distinction to be drawn between what I may typically call wheat cultivation and rice cultivation. My experience is that in a crop of another character there are certain elements which exhaust the soil, which do not exist in rice; I believe that a man cannot live on rice alone without some other elements. Certainly my personal experience has been that you may see fields in which rice is grown from year to year, and from generation to generation, without exhausting the soil. There is a certain quantity of water supplied to a rice field, and there is some mud generally attaches to the water, and the roots of the old rice crop are no doubt rotted by that water. At all events, I think, the practical result is that you may grow rice crops year after year without exhausting the soil, and therefore this inundation system of irrigation, such as I have alluded to in the Madras Presidency, where your canals irrigate rice lands, is more likely to be profitable in the long run, because I do not think the soil is exhausted to the same extent; I feel it is only right that that should be stated. Then again as regards the unhealthiness, I think it is clear that a distinction must undoubtedly be drawn between the unhealthiness of the upper districts and any slight unhealthiness that there may be in the deltaic districts. I believe there is not any very great unhealthiness in those deltas, but as I have said, the subject is one which requires to be a good deal further exhausted. My own impression certainly is that taking the character of the cultivation, the comparative absence of unhealthiness, and the comparative facility and cheapness of irrigation during the drought season, by far the most profitable works of irrigation are those of the deltas of great rivers lying in a very dry country. But on the other hand I am led to believe that as regards southern India at least, those deltas have been exhausted, and there is not much more to be done.

Chairman—continued.

Sir *G. Campbell*, M.P., K.C.S.I.

23 May 1878.

1819. If the same conditions existed in other parts of India under which those irrigation works in the delta were constructed, you would advocate irrigation being extended to them?—I would certainly, and I believe that those conditions do, to a certain extent, still exist in the Punjab and in Sindh. My own opinion is that in case you could get over this difficulty about unhealthiness, there is still a very great field for artificial irrigation in those countries; I have been very much influenced in this view by what I have lately seen in Egypt. It is certainly the case that the plain of the Indus very much resembles Egypt; it lies in very much the same latitude, and possesses a soil which is almost equally fertile, and I do not see why the prosperity which certainly does exist in Egypt, should not to a somewhat similar degree be reproduced in the plains of the Indus; if you can only get a similar system of irrigation without unhealthiness and grow similar crops. Therefore, in my view you may look with great advantage to those plains of the Indus and the Sutlej, for an extension of your irrigation system, provided only you can get over the unhealthiness. I am the more inclined to that view because those are plains possessing a soil and a climate which peculiarly fit them for the cultivation of wheat. They already produce large quantities of wheat; we know that the supply of wheat from India to England is increasing every day, that supply is very much derived from the Punjab, and seeing the extent to which this trade is growing, I believe that it is capable of very great extension; and that if you could cultivate those Punjab plains, which are up to the present moment, owing to the want of rain, an almost virgin soil, you might derive immense wheat crops, making them the basis of a very large extension of the export trade from India to Europe.

1820. Which trade I assume would be facilitated by the completion of the Indus Valley line?—Yes, it would be very much facilitated by the completion of the Indus Valley Railway. But on the one hand, whilst I point to the Punjab as a country in respect of which I think a great deal may be done by means of irrigation, also on the other hand I bear this in mind, that the population of the Punjab is by far the finest that we have in India. If we want soldiers, it is to the Punjab that we must resort, and in many respects the population is a population which I would be exceedingly sorry to destroy; and therefore I hope that irrigation will not be carried too far in that country, without very fully inquiring into the subject of unhealthiness,

Sir *G. Campbell*, M.P., K.C.S.I.

23 May 1878.

Chairman—continued.

and taking care that you do not destroy the population.

As regards the North Western Provinces and Oudh, and also as regards Bengal and Orissa, my opinion is, that the irrigation works which have hitherto been constructed, or are now under construction, are so considerable that it is very much better that we should not carry them further at present, but that we should hold our hand in those countries until we see further the effects of the present canals, and of those which are approaching completion, until we ascertain their financial effect, until we ascertain more thoroughly their economical effect, and until we ascertain their effect with regard to the exhaustion of the soil, and the unhealthiness which has hitherto so much attached to them. But on the other hand, in addition to the Punjab and Sindh to which I have alluded, I believe that there is a very great field for works of irrigation in that dry part of southern India, which has been the scene of the most recent famines. I have not myself an intimate acquaintance with that country, and I am not prepared to say why the Madras Irrigation Company seems to have been so far a failure, or why by means of the works derived from the rivers those countries should not be irrigated; I consider that those two large tracts of country, the higher and dryer countries of central India, and the plains of the Indus and the Sutlej, are the two tracts in India in which cautiously and with consideration, irrigation works may probably be extended with advantage. With regard to other parts of the country, my impression is that the Government should not be too much influenced by waves of opinion, and should not force, as it were, upon the local governments and local administrators the necessity of submitting irrigation projects; that it should rather be left to those local authorities to submit irrigation projects when they really think that they are necessary, and that they are likely to be paying and beneficial; that they should not, as has hitherto been done, be almost driven in deference to public opinion to search for irrigation projects, and submit them whether they are wanted or whether they are not.

1821. Can you state whether any administrative difficulties stand in the way of the success of irrigation?—Yes. I should like once more to submit to the Committee that to which I have already alluded, namely, that I believe there are very great difficulties and drawbacks which very much hinder the success of irrigation in respect of the means of distribution of the water, and that that is also very much connected with the question of land tenure. Sir Arthur Cotton used some expressions, to which I adverted the other day, with respect to the incredibly bad revenue management of Orissa, and I said that I believed that there was no foundation for that statement as it is generally understood, but I think it is possible that Sir Arthur Cotton alludes to the land tenure of Orissa being of a character which very much hinders the spread of irrigation, and if that is what he means, I believe that there is some truth in it. As regards the difficulties of distribution I would put it in this way; I commenced my evidence by explaining to the Committee that I think it is entirely a fallacy to suppose that the natives, especially in the dryer countries, do not want the water, because they themselves take very great pains to get water; in fact, there are very few parts of India in which the natives do not at one time or other want water, even in countries which are well watered; it is in a greater degree as it is in this country; the supply of water is irregular and uncertain; sometimes you have water when you do not want it, and sometimes when you do want it you do not get it; and therefore I make bold to say that not only in the dryer countries, but in almost all the countries of India, if every man could have a water tap in his own field, by which he could turn on the water whenever he wanted it, and another tap by which he could turn it off, I have not the least doubt that almost every native in the country would pay, and pay handsomely, for a supply of water of that kind; therefore, believing that to be so, I think that, in the case of irrigation works, where there is a very small demand, that small demand is in a great degree due to the difficulties of distribution, and not to any unwillingness on the part of the natives to take the water; I think that they will not take the water, not because they do not at one time or other want the water, and not because they are not and would not be prepared to pay a fair price for the water in order to secure a supply at the time when they might happen to want it, but because they cannot get it in that shape; because, in fact, they do not get it in this way, that they can turn it on when they like, and turn it off when they like, but they are obliged to take it when it is given to them by the Irrigation Department. The Irrigation Department, as I explained the other day, being a large department, and acting upon a large scale, cannot give every man his water when he wants it, but gives it to him when it is convenient and possible for the Irrigation Department to supply him with that water. Then, there is no doubt a great deal of difficulty in regard to the large number of subordinate servants who must be employed in distributing the water over their fields, and the cultivators are very much subject to their caprice, and to their good-will or ill-will, and there is, no doubt, a good deal of corruption amongst them. Altogether it is fair to say that very great hindrances arise in regard to the distribution of the water.

Also with respect to the tenure of land great difficulty arises. I think I have already alluded to a difficulty which is one of an extremely practical character, and that is, that the ryots' fields, being so small and so scattered, it is almost impossible to supply a ryot's field if his neighbours will not take the water also, because those fields run so much into one another, and are so intimately connected with one another, that it is impossible to supply a very minute field if the other ryots will not combine and take the water. Then, what has been a very constant subject of complaint on the part of the Irrigation Department, and especially has it been so in Orissa, is, that it is stated that the ryots constantly say, "If we take your water we shall pay a rupee to you for the water, but the zemindar will certainly raise our rent two rupees, and so whilst we pay you one rupee only, we shall really have to pay three rupees for the water." That is undoubtedly a view in which there is a good deal of truth, because it is an old fashion of the country to distinguish land for the purpose of revenue and

rent

Sir G. Campbell, M.P., K.C.S.I.

23 May 1878.

Chairman—continued.

rent into wet and dry land, and the wet lands, where they are assessed in cash, are generally assessed at a higher rate than the dry land. It is frequently no doubt the case that the zemindars do raise the rents when the ryot turns his fields from dry into wet land; and where the land revenue of the Government is permanently settled, it does seem a very great evil and a very great injustice that the zemindar, who has contributed nothing whatever to those irrigation works, who has neither contributed his money nor his labour, nor anything else, should derive this large profit, whilst the Government loses its money, and the ryot may possibly be deterred from taking the water. Therefore I think that in the case of permanent settlement, it is necessary that something should be done.

1822. Has not the Bengal Government some Bill by which they propose to obtain the water rate from the zemindars, and not from the tenants?—A Bill of that kind was proposed; but the Bill which proposed to take a special water rate from the zemindars of lands which were benefited by irrigation, was so hotly opposed by the zemindars, that it has been withdrawn, and the other Bill which has now been brought into force, is one which proposes a general cess over all Bengal, to make up the deficiencies of the Public Works Department.

1823. The imposition of a water rate on the zemindars would meet the difficulty to a certain extent, would it not?—It would, to some extent, meet the difficulty. My own opinion is, that in temporarily settled estates, all you have to do, or all that you can do, is to give thorough protection to the occupancy ryots, that is to say, ryots who have the right of occupancy, and whose rent cannot be raised, except upon certain conditions; up to the present time, they have not been sufficiently protected, and I think that they have a right to be protected everywhere; and in those irrigated districts especially, it is right that you should give them very special and careful protection; but for the rest, I am not inclined, during the currency of the temporary settlement, to do anything which has to a certain extent some appearance of bad faith with the zemindars; I do not think that it would be worth our while to incur that imputation in order to derive any additional revenue which we might derive from the increase of rent owing to irrigation during the time of settlement. I think it would be enough that we should wait until the end of the settlement, and at the end of the settlement, if it appears that owing to irrigation and other causes the rent of the land has been increased, then no doubt we shall derive that indirect benefit from irrigation in the shape of increased land revenue, which has been so much claimed by the Irrigation Department, and which I fully admit does exist to a certain point, although, as I have said, I think it is impossible to distinguish it accurately in figures from the increase due to other causes; on the other hand, in those districts which have been permanently settled, where the Government have introduced works of irrigation, which it has been made perfectly clear, have really been successful, and have really been beneficial, and have really very largely increased the rent of the zemindars, there I think it would be fair, that some compulsory cess, as a recompense for the benefit conferred upon those lands, should be taken from the zemindars of those permanently settled districts.

Chairman—continued.

1824. Was not it one of the conditions of the permanent settlement that the zemindars should provide the means for irrigation?—I am not quite sure that it can be put as broadly as that. In the stereotyped form under which the permanent settlement of Bengal was made, there was a distinct provision that the zemindars should provide what was called "poolbundy," that is to say, the making of "pools." At the time when the road cess was introduced in Bengal, a great question rose how this word "pool" was to be construed. A pool may mean either a bridge or an embankment. When we wanted to impose the road cess, we said the zemindars were bound to make pools in the sense of bridges and embankments; that is to say, roads. When we want to impose the irrigation cess, we say they are bound to make embankments for the purpose of water reservoirs; but I am afraid that question is one which always must remain doubtful. I can only say this, that I think that this provision for poolbundy does give a certain equitable and moral justification for a measure of compulsion with regard to the irrigation cess. That matter has assumed considerable practical importance in reference to the province of Behar. In the case of the Soane Works, allusion to it has already been made. I have said that the zemindars of Bengal, generally, had very great difficulty in carrying out the improvements which they were expected to carry out, because their tenure was so much split up by the laws of inheritance, and there are so many limited tenures; but in Behar it so happens that they have had a system of majorats, that is to say, very large zemindarees descend undivided to the eldest son. I understand that Mr. Eden, the present Lieutenant Governor of Bengal, had hoped to induce some of those big zemindars, and he mentioned the Maharajah of Domraon, to take the water in gross and distribute it to his ryots. But, on the other hand, my impression is, that if the Maharajah does so either he will have the same difficulty, which the Government have, with reference to the supplying particular ryots and dealing with particular ryots, because those estates are of enormous size; or he will exercise enormous power over his ryots, which, under the present law, he does not possess; and, therefore, an advantage would be given to him, to which, I think, I alluded in the former part of my evidence. But of one thing I do feel a very strong opinion, and that is, that in order to get over the difficulties of the distribution, whether you deal with villages in which the Government is the superior of the cultivator, or whether you deal with large zemindarees, you must have some system by which you shall enable the body of ryots of each village to decide whether they will have the water or not. It is quite impossible that you can distribute the water to every field of every individual ryot, independently of the supply of his neighbours; and, therefore, where you have not the village system which has worked successfully for the distribution of water in the North West Provinces, and the Punjab, you must establish something of this kind, at least for irrigation purposes; you must pass some kind of Permissive Bill, by which the majority of the ryots should decide whether they will have the water or not.

1825. In fact, the water would be dealt out, not to individuals, but rather to communities?—

Sir *G. Campbell*, M.P., K.C.S.I.

23 May 1878.

Chairman—continued.

Yes, to communities. With regard to this view of the subject, I would again impress upon the Committee the extreme necessity, both for irrigation purposes, and for many other purposes, of cherishing and developing local institutions, by which the people should learn to govern themselves, both in respect of water and in respect of other matters.

Mr. *Sampson Lloyd.*

1826. Is it not the fact that the ryots on the permanently settled lands, are very much more poor and needy than under the village system?—There are districts and districts; I do not think that is so in all the districts. In some of the permanently settled districts of Bengal, the ryots have very strong rights, especially in Eastern Bengal.

Chairman.

1827. You have been good enough to give us your views as regards irrigation, simply looking at it as a means of supplying water; will you be good enough to give us your views as regards communications, and the necessity of increasing them?—In stating my own experience, I think I have incidentally given the Committee most of the views which I can with advantage submit. There are only one or two points in this subject with respect to which I would say one or two more words. I am decidedly of opinion that in constructing irrigation canals, regard should be had to navigation as far as possible, and probably to a greater degree than has hitherto been the case in respect of many of our canals. I have also stated to the Committee that in the deltaic districts of Bengal, and, perhaps, in some other parts of the country where railways are difficult, and water communication is easy, it is desirable that water communication should be developed as far as possible; but on the other hand I am very strongly of opinion, and it is an opinion which has been very much corroborated by my experience of the Godavery Works, and to some extent by the Midnapore Canal, that where you have not exceptional facilities for water communication, where the construction of your canals involves very heavy lockage and the like, there water communication is not likely to be profitable in India, and railways are very much to be preferred. I think there was circulated to the members of the Committee the other day, a book to which reference was made in which a sketch was given of a system of water communication throughout India. I observed that not only did that sketch presume that canals might be carried over inaccessible mountains, which have not even been explored up to the present day, but in the best known parts of India it was proposed to carry canals over countries, the physical features of which would absolutely necessitate lockage, not only of hundreds of feet, but even of thousands of feet, because the Western Ghats could not be passed in the way in which it is proposed to pass them by those canals without a rise of, at least, 2,000, if not of 2,500 feet. I have not the least hesitation in expressing my opinion that any canals which required not only so much lockage, but one tithe of so much lockage, never are likely to pay in India, because the climatic conditions are such, and the elements of nature are so violent, that your locks and your appliances must be made, as they are made upon any canals of which I have had experience, upon an extremely expensive scale. I am quite satisfied, that canals of that kind, involving heavy lockage, never can pay, and that they are both very inferior in use, and financially very inferior to railways.

Chairman—continued.

1828. And I assume there would be a danger of their water evaporating?—Yes, there would be; I think it is possible that a supply of water might be found, but the expense of lockage, and otherwise, would be so great, that I certainly think they would not succeed.

1829. There is one scheme in this system of navigation which I should like to call attention to, it is a proposal to run a navigable canal from Cape Cormorin to Carwar; I believe that canal would pass through a tract of country which is already abundantly watered, and which would present almost insuperable engineering difficulties, and would moreover have to compete with the sea?—Yes, so far as I know, that canal would present very great engineering difficulties, and would be in competition with an easy sea communication, which would tend to render it unremunerative.

1830. And it would pass through a country which has annually an abundant supply of rain?—Yes, that is so; an almost excessive supply of rain.

Then, as regards railways, I should just wish to submit this as one reason why light and cheap railways should sometimes be preferred to roads, namely, that in many parts of India, and especially the alluvial plains, there is extreme difficulty to get metal for making roads. In a great part of Bengal you cannot get metal at all, and the roads are merely mud embankments, which become impassable in the rains, or they are metalled at very great expense by burnt bricks, which do not last long, and which are so expensive that it would be impossible to use them upon a very large scale. That being so, I am inclined to think that, inasmuch as the great expense of Indian roads, namely, the bridging and such like, must be equally supplied, whether for a road or for a railway, it may be a good deal cheaper in the end to put upon your track cheap iron rails, rather than expensive metal, which must be continually renewed. Seeing the success which has hitherto attended railways in India, I am therefore very much in favour of light railways. I am inclined to think that a four feet or a four feet three gauge would be very much preferable to what I think I have called the pedantically-narrow metre gauge. It is a very great misfortune in India that our main lines of railway have been made upon the broad five feet six inches gauge. If they had all been made upon the English guage, which I think is four feet seven or four feet eight, no question would have arisen. There would not have been the least difficulty in running both our main lines and our local lines upon that intermediate gauge. But having a wide gauge for main line purposes, there is the question whether a narrower gauge must not be used for local lines. My own impression is in favour, at all events, of a gauge not so narrow as the metre guage

1831. Have you any acquaintance with that line which is being made between Muttra and Hattrass?—I knew that country well before the line was made, but I have no knowledge of it since; but I know that it is likely to be an extremely

Chairman—continued.

tremely cheap line, because there is no engineering difficulty in the country.

1832. It is a work which is being carried out by a municipal or local community, is it not?—I do not know the details.

1833. You are acquainted, no doubt, with the financial purposes of the Government of the present year, and I presume you are strongly in favour of the principle of decentralising the financial responsibilities of the Supreme Government, and placing greater responsibility, both as regards control over revenue and expenditure, upon the local governments?—I am very strongly in favour of the system of decentralisation. I had experience of the working of that system when it was first introduced in 1870, and in my view it has been wholly successful.

1834. If the localities are to become responsible for the success of local schemes, you at once have an effectual safeguard, have you not, against extravagant schemes being put forward by the different local governments?—That would be so to a certain extent, if you could really make your local governments and your localities strictly and really responsible; but what I doubt is this, that I do not see how you can make them responsible, in the real sense of the word, because they have, if I may so express it, nothing to pledge, except those revenues which have been assigned to them by the Supreme Government. The term of office in India is comparatively short; reigns last but a few years; and if you allow the administrators, the local governments, or other local administrations to pledge the revenues, which have been made over to them, during their term of office, I think it may very likely lead to extravagance, because people will be ambitious, and they will be desirous of distinguishing themselves in their comparatively short term of office, and they may make away with the capital which is represented by those revenues, without the probability of their successors being called upon to repay weighing very effectually upon them; and in case they did so, I do not see what remedy there would be, because the Government of India in another generation would simply find that the capitalised value of its revenues had been spent with possibly very insufficient value to show for it.

1835. You have expressed, have you not, in the House of Commons, an opinion that it would be advisable to give facilities to localities taking up loans which have for their object the promotion of local works of public utility?—No, I think not as regards India; on the contrary, I am rather against enabling localities to take up loans too freely.

1836. At present I think the means by which money is found for public works, is by the Supreme Government providing out of cash balances the sums necessary for the prosecution?—That is so.

1837. There was a Public Loans Act passed while you were in India, was there not?—There was.

1838. In your evidence, given some time back, you expressed the opinion that all money which was advanced under the Public Loans Act ought to be shown in the Annual Revenue and Finance Accounts?—I did.

1839. Are there any instances where you know that money has been advanced under that Act, and it has not been shown?—That must be explained by the Account Department; I am not prepared to say confidently whether it is so or not, but the case of the Madras Harbour is one I mentioned; I have not been able to find the Madras Harbour works in the public accounts, and as I know money has been spent upon that harbour, I am inclined to suppose that there has been some want of clearness in the accounts, by which I mean that it has not been made clear where that money is placed.

1840. There is no system, is there, in India at all corresponding to what is in force in this country, by which the Public Loan Commissioners have power annually, by an Act of Parliament, to borrow a certain sum to make advances to different localities and different governing bodies?—No, there is not; I think that that matter is regulated by the question of the Government of India being flush of cash or not. I remember that when the Government of India had over-borrowed and were financially flush, as they had a very inconveniently large cash balance at the time, they were prepared to offer money to anybody who would take it almost, and they were extremely anxious to promote the system of local borrowing; at other times, when money is not so easily forthcoming, I apprehend they will not so easily advance money.

1841. Do you think that the present system works well?—I think it does, but at present it is in a very rudimentary state; and it has hardly been carried so far, the principles have hardly been established upon so definite a basis, that one could confidently say that it does work well.

Mr. *John Cross.*

1842. What do you mean by the Government over-borrowing?—I mean that they borrowed more money than they found that they wanted.

1843. But not more than they had authority to borrow?—No, not more than they had authority to borrow.

Chairman.

1844. I assume that the real difficulty of assimilating the system of borrowing for local public works in India to that which is in force in England is, that the localities have not the securities to offer which they have here?—The local governments certainly have no security to offer; the localities, on the other hand, have the same security to offer as localities in this country, that is to say, the security of the local rates; but then the system of local rates is so little developed in India, and the system of self-government in India is so inchoate, that I think the security is not the same as the securities which exist in this country; for instance, in a borough, or other local body in this country, you have a well established system of self-government, and you can confidently say that the people who manage that system of self-government are the elected representatives of the people; that they are acting in their interests; and that their position is such that the liability could not well be repudiated hereafter; in India, on the other hand, your local institutions, in the towns at any rate (because the village institutions are real though very often, I am afraid, very much in disrepair), where the borrowing for works is principally carried on, are very rudimentary, and they are very imperfect; and there is still much ground for the impu-

Sir *G. Campbell*, M.P., K.C.S.I.

23 May 1878.

Chairman—continued.

tation that the strings of the pretended municipalities are so much drawn by the public offices, that the patriotic and educated natives in some other day might argue that the money was not really borrowed by the local representatives, and that they ought not to be called upon to pay it.

1845. Assuming you to be Lieutenant Governor of Bengal, and supposing you wished to execute a certain number of works under the value of 10,000 *l.*, which I believe you have the authority to do, how would you get the money to carry out those works?—I should only have the money which was assigned to me by the Government of India for the purposes of public works.

1846. If it was suddenly ascertained that a locality wanted a number of small works, would you have no power of borrowing for them?—I should have no power of borrowing, except in this shape, that I might apply to the Government of India for a loan on behalf of a municipality under the Public Works Loan Act, which is very similar to the Public Works Loan Act of this country, except that there is not a specific sum assigned annually for the purpose.

1847. Therefore practically, whether the work is a great work coming under the head of Public Works Extraordinary, or whether it is a small local work, the source from which you get your supply of money is the same, namely, the cash balances of the Indian Government?—That is so in all cases in which the work is constructed from borrowed money; but there may be an assessment for local purposes, so that a work may be constructed by a current assessment.

1848. It has been stated very clearly by other witnesses, as well as by yourself, that there are two classes of irrigation works, there are those large works which have been constructed by the British Government in the present century, out of borrowed money, and there are a very considerable number of smaller works in the shape of tanks and inundations canals, tanks in Madras, and irrigation canals in Scinde; supposing the Revenue Commissioners thought it advisable to enlarge, or to increase the number of those small works, how would they obtain the money to do so?—What I have tried to impress upon the Committee is, that in the case of smaller works, that is to say, tanks (inundation works on the other hand being very often very large, running over very large tracts of country), my view very strongly is, that the money would be best obtained by a system of local institutions, under which the villages themselves should supply the labour, and the contribution necessary for the construction of those tanks.

1849. Under the present system and regulations, the Revenue Commissioners would not be competent to impose upon a locality the duty of increasing, even with their assistance, or enlarging those tanks?—I am afraid I cannot give a confident answer upon that subject, because the question has not arisen in the countries of which I have had most practical experience. I was not very long in the Central Provinces, and as I have said, the villagers seemed to manage their old indigenous system without applying to the Government, and therefore this question has principally reference to the administrative system of Madras, with which I am not fully acquainted; but I may add to what I have already said, that while I think that the villagers ought to be encouraged to make sufficient and suitable tanks, and such like small local works within their own village from their own resources, I also think that a system of short advances from public finds for such purposes to be repaid on moderate terms, is a very desirable thing, and that it is consistent with the old native and early Indian system of management under which advances, called taccavi, were made for local purposes; and in connection with this subject, perhaps I may be permitted here to say, that I am very strongly of opinion that, with regard to all works, be they small, or be they great, a sinking fund should be established, by which the capital should be paid off; and that the system which is at present pursued by the Government of India, of calculating merely the interest, without any sinking fund with regard to their larger works, is wrong and dangerous.

Chairman—continued.

Mr. *John Cross.*

1850. Does that apply to local works at all?—With regard to local works, I think that, under the Public Works Loan Act, there always is a sinking fund.

1851. I think I understood that no public money was appropriated to local works?—By the agency of the Public Works Loan Act it is. I should think it an extremely suitable thing that in Madras tanks should be constructed under the Public Works Loan Act. Whether that has been done I do not know. I have not sufficient knowledge of the Madras system to state whether it is so or not.

Chairman.

1852. Then, of course, you are of opinion that where large sums have been borrowed for the construction of those so-called remunerative public works, there should be a sinking fund?—I think so.

1853. Do you wish to express any other opinion on the subject of borrowing for public works extraordinary?—I should like to submit to the Committee some considerations with respect to the very large sums which are borrowed in times of actual famine, and which are applied to the construction of works for the relief of that famine. That is a matter which is really of very great importance in connection with the subject which is being investigated by the Committee, because, as a matter of fact, enormously large sums have lately been spent upon works which have been started for the relief of famine. It evidently is a matter of very great importance that if money is so spent it should be spent in a manner which may be of the greatest possible permanent utility; and with that view I have, as a member of a commission on this subject, and in other forms, strongly recommended that all that is possible should be done in the way of tracing out beforehand works which may be advantageously constructed, so that our plans should be, as it were, considerably ahead of our execution, and that we should always have desirable works ready to construct when the necessity arises. That plan I have myself followed as far as it is possible, but at the same time I also feel that it needs very great care to keep up those plans, because plans which are not to be immediately executed are very apt to be drawn out with some carelessness,

Chairman—continued.

lessness, and they are very apt to get out of date; for instance, when you make a railway, your whole system of roads is reversed; instead of the roads running parallel to the railways, you want cross roads to act as feeders to the railways. I might mention an instance which shows that there is nothing new under the sun. During the Bengal famine, when we were tracing out lines of road which had been designed as a means of affording occupation to the people during famine, we came upon a large embankment in the middle of a jungle which seemed just to suit our line of road, and which we were able to adapt to our road, and found it to be extremely useful, but we could not conceive how this embankment happened to be made in the middle of this jungle. But when we went back into the history of the matter we discovered from the traditions of the people and otherwise, that in reality this embankment was a relief work, which had been commenced in the year 1770, on the last occasion when a heavy famine had visited that country, but it was neglected and forgotten when the famine came to an end. We reproduced it, and finished the road in the year 1874.

Mr. *Ernest Noel.*

1854. The embankment was made for a road?—The embankment was partly made for a road, but the famine came to an end before the road was finished, and it was abandoned, and went into jungle again for 103 years till we discovered it and utilised it.

But supposing that your plans for public works are in advance of your execution, you have them ready when a famine actually comes upon you; then you have a question which has arisen, and which has been the subject of great difference of opinion, and I may say of great difference of practice, namely, whether it is most desirable to employ a famishing people upon great public works of acknowledged utility upon a large scale, or whether you should rather employ them upon small works near their homes which may not be of such great public utility, but which afford easier and more accessible employment to a famishing people. On that subject, I think, I may say that there have been two schools of opinion. I have had a good deal of experience upon that subject, and I, myself, have a somewhat decided opinion, and it is this, that in the earlier stages of a scarcity, before that scarcity has developed into actual famine, and when the strength of the people is not materially deteriorated, then large public works in which you may offer employment to the purely labouring population are enormously useful and beneficial to the country; and provided the scarcity does not go beyond a certain point, may enable you to stave the famine off altogether; by offering simple employment under the ordinary rules and regulations applicable to such employment; you may thus avoid both famine and all special means of relief which have a tendency to pauperise and degrade the people. Therefore I am very strongly of opinion that in the early stages of a scarcity nothing can be so advantageous as offering to the labouring portion of the population, employment upon great public works. That can generally be done in regard to those famines in the dryer districts, which I

Mr. *Ernest Noel*—continued.

Sir *G. Campbell*, M.P., K.C.S.I.

23 May 1878.

have described as coming upon you somewhat gradually. There you have time to make your arrangements, and you are able to offer employment to the people, and to induce the people to avail themselves of that employment, and thus, as I have said, in some cases to stave off actual famine altogether. But in regard to those rice famines, such as those which occur in Bengal and Orissa, and which I have described as being much more sudden in their operation, and much greater in their intensity for a time at least, it is much more difficult to do this. When the Bengal famine of 1873-74 came upon us, I had prepared beforehand several schemes of roads and public works, and I did make use of them to the utmost. I also took the opportunity to obtain the sanction of the Government of India to the Northern Bengal Railway as a work of that kind. Now this Northern Bengal Railway did not run actually through the famine districts but it ran very near them. It did not run very near the famine districts of Behar, where there is a very large labouring population which might readily have taken advantage of it, but it did run near the famine districts of Northern Bengal. In those districts of Northern Bengal, the population is not so excessive, and the people are cultivators of their own lands, and they are not accustomed to live by hired labour, and therefore there was much greater difficulty to induce them to leave their own homes and to resort to the embankments of this Northern Bengal Railway, which was some distance from their homes. So much was this the case that I always felt, and I think I avowed, some doubts whether the railway would certainly be successful as a famine work; and if I had not thought that on other grounds the railway was a beneficial work, and a good work, I do not think I could have reconciled it to my conscience to recommend it as a famine work. However, it has usually happened in India that we make hay while the sun shines, and although for many reasons, the famine was a very great calamity, it did enable us to get sanction to some public works which had been hanging fire, and which we had not been able to get sanction for. The Northern Bengal Railway was a work which we did get immediate sanction for when the famine commenced, in the hope that it might attract the labouring population to it; but it was not successful in that respect, as it must be admitted, for the people were not induced to come to the railway in very large numbers. The course of the famine was so rapid that before very long the actual famine was upon us; and when that took place, about the month February or March 1874, I was of opinion that the system of large public works, at a distance from the homes of the people, is not applicable, and is not beneficial. In my opinion, when a famine is actually upon you, when it breaks out, as it does break out, something in the shape of a sudden epidemic, when you find that the people are deteriorated, that they are emaciated, and that their strength is a good deal gone, then I think that to ask them to leave their homes to go to a distance to prosecute labour upon great public works, is neither beneficial to them nor to the public; for this reason, that when you would take them away from their homes, in the first place, you have great difficulty in getting them to leave their homes, for there is a very large portion of the population who will rather starve than

Sir *G. Campbell*, M.P., K.C.S.I.

23 May 1878.

Mr. *Ernest Noel*—continued.

leave their homes; and in the second place, if you do induce them to leave their homes, and their usual habits, you give them vagrant habits, and you draw them away from their own villages, and from their own fields, and from the necessary preparations for cultivation, which generally follows in the ensuing season, very shortly after the worst crisis of the famine. Upon those grounds I was very strongly of opinion, that although great public works would in some circumstances be more beneficial, still when a large population is so reduced that you do not really get sufficient work from that population, looking to the prospects and the future, it is much more desirable, and much more beneficial to the people themselves, and in the end I think more economical to the country to employ them near their own homes in small or petty works which are of a certain benefit, although not of so clear a benefit as the great works at which they might be employed if they were taken away from their homes. This, at least I can say, that under the system which was followed in Bengal, under which the people were in no degree forced away from their homes, but under which local employment was granted to them, although, perhaps, not of a very beneficial character from an economical point of view, but still sufficient to test the reality of their necessities by making them work under that system, the result was that the people did not die, and that the cultivation of the ensuing season was in no degree interfered with, but was in fact carried on to quite as large an extent and quite as successfully as in an ordinary year. On the other hand, I understand that during the last famine, the system which was followed throughout the Bombay famine, and in the latter part of the Madras famine, was to insist that the people should leave their homes, that they should enter into great camps where under the superintendence of the officers of the Public Works Department, great works were carried on, and that in that way they should be forced to earn the relief which was given to them by their labour upon those great public works. In my opinion, in that later stage of the famine, that system was a mistake, and so far as I can gather from recent accounts, it does seem that the contrast between the result of the system in Bengal and the result of the system in Madras, has been that there has resulted, we do not know how great, but it seems to be admitted that there has been a very great mortality amongst the people in Madras and Mysore; and I have also seen it stated, that the cultivation in the ensuing season has been considerably narrowed, and has not been so full and so satisfactory as in ordinary years. I am the more inclined to this view, because I find a very remarkable circumstance, and it is this: I think I may say, certainly, with the exception of the famine of 1783, of which we have no precise information, of all the famines of which we have information, the most intense, for the time at least, were the Bengal famine of 1770, and the Orissa famine of 1866. There is no doubt that those famines were famines of terrible intensity. The fact of that intensity in Orissa is made clear by the Report of the Commission which immediately investigated the subject, and the accounts which have come down to us of the famine of 1770 do undoubtedly show that it was a famine of very great intensity; but

Mr. *Ernest Noel*—continued.

notwithstanding in both those cases the cultivation of the ensuing year was in no degree diminished on those occasions. People were not taken away from their homes for the reason that almost no assistance whatever was given to them; but notwithstanding that those famines were of such extreme intensity, and that little assistance was given, notwithstanding that undoubtedly there was a very great mortality, principally among the non-effective members of the population, the very old, and the very young, and the ineffective, it is undoubtedly the case that both in the year following 1770 in Bengal, and the year following 1866 in Orissa, the cultivation was in no degree diminished, but was as large and as productive as it ever was, a fact which, as respects 1770, is made clear by the figures to which I have already referred the Committee at page 7 of the Report which I put in, showing that the land revenue, which depended upon the crops of the year, was larger in the following year, and in several years immediately following the famine, than it had ever been before.

Chairman.

1855. You have given rather strongly your opinion in favour of a system of small local works during a time of famine, as against large works under the control of the Public Works Commissioners?—Yes, during the time when famine is actually upon us.

1856. And you draw a comparison between the system adopted in Madras in the late famine and that in Bengal in 1874; you are aware, are you not, that during the last famine the system which was adopted in Madras was that which had already been in force in Bombay?—I am aware of that.

1857. Are you aware that from the figures which were laid before the India Office it was quite clear that whereas in Bombay a regular system of public works had from the first been carried out, and people in large numbers had been put upon them, the expense was much less, and the mortality was less, than in Madras, where the reverse system was adopted; and that in Mysore, where the test had been the slightest, and where it was easiest for people to obtain employment, the mortality was highest and the demoralisation of the people greatest?— I am aware that it was as has been stated in Bombay, that is to say, that a system of large public works was carried out, and that it was, I believe, to a very great extent successful in averting actual famine. I am not aware that the relief given in Mysore was greatest and the test easiest: on the contrary, I have been led to believe that very little was done for the people of Mysore in the earlier stages.

1858. If you compare the system adopted in Madras in the late famine, would not it be fairer to contrast that system with the system which was in force in Bombay rather than with the circumstances of the Bengal famine, which might have been of quite a different character?—No; I am rather inclined to put the matter in a way which tallies with the opinion which I have expressed, namely, that so long, and so long only as the scarcity does not go beyond a certain point, you may stave off actual famine by a good system of public works. To illustrate that, I would compare the North Western Provinces in 1873-4 with Bengal and Behar in the same year. It has

Chairman—continued.

has been sometimes supposed, and I think Sir John Strachey, who was then connected with the North Western Provinces, was very much inclined to suppose, that because very moderate public works sufficed to stave off famine in the North Western Provinces, therefore the need which was supposed to have existed in Bengal was very much exaggerated. Now I think I may with some confidence submit that the explanation is of a totally different character, namely this, that the degree of scarcity, I cannot call it famine, because in the North Western Provinces there never was a famine, but the degree of scarcity was totally different. I have explained that the famine of 1873–4 was almost entirely a rice famine, and that it affected the country in which rice was the staple food of the country. The rice country is a country which may be pretty exactly defined. You may draw a geographical line showing which is the rice country and which is the country in which other crops prevail; as I have already stated that line is to be drawn in Behar; you have a rice country in North Behar, where you had actual famine on account of the failure of rice; and in South Behar, you have a country which, in addition to rice, grows a number of other crops, and where, although there was great scarcity, they escaped actual famine. When you get across the border, over into the North West Provinces, you have a country where rice forms but a very small part of the cultivation, and where other dry grains, most of which throve quite well in that year, were the principal food of the country, so that in fact in the North West Provinces you had but a very partial failure of the crops, and a scarcity which was rather due to the demand for grain, and the excessive price given for it, and its importation into the famine districts, rather than to local failure. The consequence was that in the districts of the North West Provinces the scarcity never did amount to a real famine, and a very moderate provision, in the shape of public works, was sufficient to provide for the necessities of the people which was principally due to the dearness of provisions; but they had never got to the point of famine; whereas in Bengal, although up to a certain period public works sufficed, when you got to the point of famine you were obliged to grant, as I believe rightly and beneficially, local relief. I am inclined to suppose, that though not in the same degree, still somewhat in the same manner, you may contrast Bombay with Madras in the year 1877. From all that I have been able to learn, I am inclined to suppose that in reality the famine was not of nearly so intense a character in Bombay as it was in Madras, and therefore being of a less intense character, and being rather in most districts a scarcity short of actual famine, I believe that by a judicious system of public works very well administered, as I believe it was, you were able for the most part to stave off famine; but it was found that you were not able to do so entirely, and the reports seem to show that in reality, even in the Bombay districts, there has been a very considerable amount of mortality. On the other hand, I believe that in Madras and Mysore you had in the latter stages the state of things which I have depicted in the previous famine in Bengal and Behar; that is to say, the famine was much more intense, and it had passed the point at which it might

Chairman—continued.

Sir *G. Campbell*, M.P., K.S.C.I.

23 May 1878.

be provided for by large public works; in fact the local governments seem in some degree to have failed to provide large public works in the earlier part of the famine; and when the famine became more intense, when the population was very much deteriorated and emaciated, then it was that the Government of India insisted upon a change of system, insisted upon introducing large public works, and insisted upon sending the whole of the relief people to relief camps. My impression is that the population to be relieved was so large it was not possible that the thing could be carried out sufficiently, and that many people would not go to the relief camps, that many of them preferred to go somewhere else, and many of those who did go to the relief camps suffered from epidemics, and in other ways. I must admit that I have seen a letter from Mr. Elliot, a very distinguished civilian, who was sent by the Government of India to carry out this system, and who has been the champion of this system in the press, and is now appointed Secretary to the Famine Commission in India; Mr. Elliot in that letter described a relief camp, which, according to his description, was a model of everything that was good; the people seem to be cared for in the most admirable manner, and to be healthy and happy, and everything else. But my doubt is whether, although it is possible to establish and to maintain successfully a model camp of this kind, it really is possible to do so when you come to deal with great masses of people. You may deal with several thousands of people, but when you come to deal with millions of people, I doubt the possibility of doing so. You cannot have camps enough to maintain that enormous population; and if you maintain them, the probability is that you will have great epidemics, and great mortality has, in fact, occurred.

1859. A strong argument in favour of having large camps and big works was, that you could employ the agency of the Public Works Department, who were accustomed to deal with large gangs of people, and who had the experience and the means of exercising proper supervision, whereas it was found in Madras that the civil authorities had not the agency or the experience to do so, and in consequence, in many camps, the people did not get the food which they ought to have done?—In one point of view that certainly is so, but from another point of view, and what in Bengal we considered a much stronger point of view, we found that the argument which has been used told just the other way; because what we found was this, that the Public Works Department were accustomed to exact full daily work under strict rules and regulations, and they had always been responsible to their superiors for obtaining a sufficient quantity of work for the wages which they paid, and we found that they were, if I may so express it, almong incorrigible in adhering to that system; that is to say, they insisted that something like an adequate amount of labour should be given in return for the wages they paid. Now I quite admit that that is right and beneficial so long as the population are capable of labour, but when you come to an emaciated and debilitated population in which you have every degree of emaciation and debility, and in which some men are fit for work, others are

Sir *G. Campbell*, M.P., K.C.S.I.

23 May 1878.

Chairman—continued.

fit for half work, and others are fit for scarcely any work, then to apply to them strictly the hard-and-fast rigid rules of the Public Works Department, we find in practice to be extremely injurious. It led either on the one hand to the people refusing to take this work under those strict rules, or on the other hand to great difficulty in applying those rules, because we found that it was quite impossible for the Public Works Department to discriminate between the quantity of work which one man could do and what another man could do, seeing the immense variety in the degrees of emaciation. If you made your rules too lax you come to this state of things, that the able-bodied made an enormous profit far beyond what was right or desirable that they should make, whilst the emaciated barely made a livelihood. In that way our experience was that the Public Works Department were not capable of dealing with the people in the same considerate way in which the civil officers were, and we devised a system under which the Public Works officers should lay out the works, and should be responsible for the strictly engineering view of the case, but that the employment should be regulated by the civil officers under very lax and elastic rules ; the effect of which was undoubtedly that a good return for the wages expended was not attained, but a test of the reality of the need was imposed upon the people, and some work was obtained in return for a form of relief which did not take the people away from their homes, and did not demoralise them in other ways.

1860. As I understand it, you are in favour at the commencement of a famine of beginning large works under the superintendence of the Public Works officers, but that if the famine increases in intensity, you think that other means should be taken to supplement and to assist the system of public works?—I am, with this provision, that when your scarcity is considerable, I think there must be some considerable modification of the rigid rules of the Public Works Department, and that they must modify their departmental rules largely in accordance with the exigencies of the peculiar situation.

1861. Is it not your experience that famine labour is very expensive?—Famine labour, undoubtedly, is very expensive, and if the object was to execute public works, it would be comparatively unprofitable labour, but the object being to relieve the people, we ought to submit to a very considerable loss, provided we get some return, and that a test of the necessity is applied in the shape of labour.

1862. Therefore you think that when there is any prospect of a serious famine occurring in any one locality, the Public Works Department, in the first instance, should be ready with such large schemes as would, in the first instance, absorb those who were unable to obtain employment?—I think so; but I am also of opinion that where there seems a prospect of famine, the Public Works Department should act in concert with, and to some extent in subordination to, the administrative officers of the district.

1863. Would you express your opinion as to the establishment of the Department of Public Works?—In relating my experience of public works, I have incidentally said a good deal regarding my experience of the Public Works Department. In my earlier service there was a good deal of jealousy, I think I may say, between

Chairman—continued.

the Public Works Department and the Civil Department of Administration; at that time they were entirely apart. It was the custom of the civil officers to accuse the Public Works Department of great extravagance, and a want of sufficient supervision of their subordinates, and of executing their works in a very costly way, and sometimes not of the very best quality; with respect to lime in particular, it was a sort of proverb of the Civil Department that the lime of the Public Works Department never lasted but a very short time.

Mr. *Fawcett.*

1864. What year are you referring to?—Twenty-five or 30 years ago; at that time the Public Works Department was a very limited department; it consisted entirely of military engineers, and I do not think that they had the means or the machinery of sufficiently supervising their subordinates. Things have no doubt been very much improved of late years; the Civil Department and the Public Works Department have been brought together, and made to work together in a way which is very beneficial to both of them, and the Public Works Department itself has been very much improved. But it is still not a perfect department, because it consists of such a miscellaneous assortment of people derived from a great variety of different sources. First, we have the remains of the old engineer officers of the Company, the old Bengal, Madras, and Bombay engineer corps, who have all their lives been devoted for the most part to public works, and who are very experienced men. Then we have a system which I do not myself think a good system, under which the young officers of the Royal British Engineers are appointed for a time to work in the Civil Public Works Department of India; I do not think it is good, for this reason, that those young officers are Royal Engineers of the Military Department; they look to other objects than the Local Public Works Department of India; and their term of service in India I believe is strictly limited by the regulations of the army to seven years; and the consequence is that they have only just time to acquire a knowledge and experience of the country when they are withdrawn to other service in other parts of the world. Also, I have reason to think that the young engineer officers are not themselves satisfied with their position at the bottom of the department, seeing that they are not likely to stay long enough to rise to the top of it; and upon the whole I have very great doubts whether this system of employing those young Royal Engineers in the Civil Department of the Public Works Department in India is really a good one. Then we have a number of very excellent civil engineers who up to this time have been recruited in a somewhat miscellaneous manner. There were a good many civil engineers of some experience who were taken on at various times, and under various conditions, by the Government at home. Then, after the mutiny, a very large number of officers of the native Indian army having been thrown out of employment, many of them were turned into engineers of the Public Works Department, and they are now in that department. Although they were not originally bred as engineers, some of them have developed a natural talent for that sort of thing, and some

of

Mr. *Fawcett*—continued.

of them have not developed it at all. Then there are in the department a good many miscellaneous European officers of all sorts and kinds, who have been taken on, and by practice have become, more or less, engineers, although they were not originally engineers. And then we have a certain number of natives, the department being open to natives as well as Europeans. But with regard to that subject, of the employment of natives, I should like to say a word. It seems to me that in most departments of the public service, and notably in the department of engineers, an educated young native is apt to expect too much; he expects always to be put immediately upon a level with the European engineer, who is imported from Europe, in respect of pay, and in respect of all other things. Now it seems to me that that is not a fair way of putting it, because a European officer is imported from a country where labour is dear into another country where you must pay for his labour about three times what you pay in his own country. On the other hand, the native officer is the native of a country where labour is cheap, and who is not required to leave his own country, and who therefore has no claim to additional pay on account of that expatriation, for which you must largely increase the emoluments of your European public servants. I think that the educated natives, who are for the most part educated, not at their own expense, but at the expense of the Government, make a somewhat exorbitant claim when they suppose that as soon as they have qualified for the public service they ought to be employed on the same terms as European officers are employed. I must say broadly this, that although they may pass the same educational standard that European officers pass, still I believe that, as a matter of fact, although exceptional natives have the energy and the pluck, and the qualities of Europeans in a very eminent degree, the average native has not those qualities to the same degree as an average European, and therefore although he may have passed the same educational standard he is not equally valuable to the public service. That as I have said is so with regard to all the departments of the public service, but is especially so with regard to the engineering department, because it is a department which for its own sake the natives do not affect so much as they affect some other professions. A native is very fond of the civil service of the Government, and he is very fond of employment and profit as a lawyer, but the hard physical work of an engineer, although it suits some exceptional men amongst them, does not very well suit the great body of them; and therefore with regard to that department they are less willing to enter it than they would be to enter other departments unless they at once on completing their education receive a status and a pay higher than that to which I think they are entitled. I speak somewhat feelingly upon this subject, because I was myself extremely anxious to promote the practical employment of the natives of India, and especially, when I administered the Government at Bengal, I did all that it was in my power to give them practical habits and good physical habits. I insisted that at our schools they should be taught gymnastics, and that they should be taught riding, and I introduced the physical sciences and engineering, and everything of that kind, and for the time gave

Mr. *Fawcett*—continued.

Sir *G. Campbell*, M.P., K.C.S.I.

23 May 1878.

considerable stimulus to education of that kind, and especially I was successful in giving a great stimulus to the engineering department of the Presidency College. That department during my incumbency rose very considerably in numbers, and I was in hopes that it would have supplied qualified young engineers who would have very largely spread over the country the benefits of scientific engineering at a moderate rate of pay, and altogether upon easy and moderate terms. I have therefore been very much disappointed to read in the newspapers that the engineering department of the Presidency College has, during the last year or two, again very much fallen off, that the native students had not obtained that high pay and that high employment which they expected, and that they were not willing to take lower pay, and consequently their zeal for the department was a good deal evaporated. I very much regret that that should be so, but at the same time I must express my belief that taking man for man, it is not desirable to employ an average native on the same terms as an European; that, on the contrary, we must rather look to their gradual education, to their gradually becoming willing to accept hard work upon what I call reasonable terms, looking to the value of labour in India as compared with this country, and looking to the terms which a young man, who has at considerable expense completed his education, is ready to accept work in this country. It seems to me that those educated natives might very well accept much lower terms than they now demand, and that if they were to enter the lower grades of the Public Works Department and the other departments, they would have before them a fair field of promotion by which those who did well should rise to very respectable and considerable employments, and those who showed a real genius and a real aptitude, making them in reality officers equal to the best European officers, might rise to the very highest posts. I am in favour of offering to natives employment upon moderate terms in the first instance, and of giving them every fair opportunity of promotion, but not of placing them in the first instance in too high a position in respect of which it may happen that if they do not fit themselves for promotion to the very highest posts, they will be disappointed men for the greater part of their lives, and will not render to the public service that efficient aid which might be expected of them. On the other hand, as respects the supply of European engineering officers from Cooper's Hill, I have not the most recent information which would enable me to say whether the supply which has lately been sent out to India, is more or less than the necessities of the public service require, but I am very strongly of opinion that an institution of that kind is beneficial, and calculated to promote the best interest of India; for this reason, that as far as I have been able to learn, it has always been remarked that amongst our English engineers, although there has been an excellent practical education, although very many or most of them have, by a rule-of-thumb sort of practice, come to be very good and efficient men in their profession, still they are deficient sometimes in general education, and almost always deficient in the theoretical education which is afforded by the engineering schools of many continental countries. We have considerable schools of the kind in Edinburgh, and I believe to some extent

Sir *G. Campbell*, M.P., K.C.S.I.

23 May 1878.

Mr. *Fawcett*—continued.

in London, but we have not, at most of our universities, such schools. I believe that there exists no complete engineering school in the country equipped with every necessity for turning out young engineers, except this Cooper's Hill College, which has been established by the Indian Government; therefore it is that, seeing the want of such means of education in this country, I do think that it is a right and a proper thing, and beneficial to India, that even at some expense to the Government this college should be maintained for the purpose of supplying to India young men with the best theoretical education as engineers, and whom by practice you may render perhaps better than any class of engineers whom you have yet had. At the same time I do feel, in reference to the engineering service, as in reference to all the other services in India, that cut off as they are from what is going on in Europe, there is a great danger that our limited and exclusive services may run too much in one groove; and I believe it to be very desirable that the engineers whom you send out in the covenanted Government service should have before them, by way of example, and means of emulation, the work of other engineers who are employed by companies or private individuals, or in any other ways in India. I believe that great benefit has resulted to the Public Works Engineering Department from the example of the engineers of the East India Railway, and other enterprises.

Chairman.

1865. You concur, I suppose, with the opinion expressed by previous witnesses that care should be taken to prevent the establishment from becoming too big by annually sending out too large a number of young engineers from Cooper's Hill?—I think so. My own opinion with reference to the engineering department, and with regard to all other departments, is that you should very carefully limit the number of European officers who are employed in subordinate departments, and that you should employ only just as many as will afford a sufficient run of promotion to the higher departments, but that for all subordinate departments of the public service natives should be employed.

1866. I suppose that the efficiency of the Public Works Department has increased very considerably since its establishment?—It certainly has; I think its efficiency has increased, and is increasing every day.

1867. And, considering the very exceptional difficulties with which the engineers of that department have had to contend, do you think, upon the whole, that their work has been well done?—I think that, upon the whole, it is now well done; but there have been very grave and great exceptions.

1868. Is there any other point connected with this inquiry upon which you would wish to give an opinion to the Committee?—Before concluding my evidence, there are one or two points of a general character with regard to which I should like to be allowed to say one or two words. The first is this, that in judging of this whole question of the advantage and disadvantage of the public works, I feel that we are in very great difficulty, on account of the matter having been so exclusively entrusted to the Public Works Department. At present all our

Chairman—continued.

accounts are drawn up by that department; all the reports are drawn up by that department; and in everything connected with this subject you have that state of things, as it were, in which a man has painted a lion; you have not an opportunity of judging what the lion would say or how the lion would draw the picture, if the lion were the painter. It being undoubted, I think, that the department must be somewhat partial to their own view of the case, there has been a good deal of exaggeration of the advantages of the Public Works Department. Then you have another set of people, who have not been in possession of the full facts, but who have taken the other extreme, and who have denounced everything that has been done by the Public Works Department as bad and unprofitable. There is an honourable Member of this House who, I think, could say something on that subject. But in order to get at the truth, and to avoid those extremes on the one side or the other, I am very strongly of opinion that there should be what I may call an impartial department of the Government, a department which is not exclusively responsible for the Public Works, which has neither reason to unduly magnify its advantages, nor unduly to detract from them, and which should submit to the Government and to the public the facts, the figures, the amounts, and the general results, as far as may be, in an independent impartial manner.

I also think that we must be upon our guard against being too much carried away by what I think I have called waves of public opinion, especially those waves of opinion which from time to time arise in this country. I think that we have on several occasions been carried away by the too enthusiastic desire of the public to carry on a particular class of public works without sufficient inquiry; and especially that there has been too great a disposition, when such waves of opinion rise high, to suppose that the salvation of India depends upon borrowing as much money as possible, and making as many public works as possible. Now it seems to me that, as a rule, both with regard to works of irrigation, and with regard to other works, the real test, and the best test, is whether a work will pay, and that as a rule you should not make public works, except when from a thoroughly dispassionate view of the case, you really have good reason to believe that the work will pay commercially; and it is the more necessary that this side of the question should be carefully considered, because I do believe that there are circumstances, both with regard to the general law which regulates the formation and management of companies, and with regard to the special position of companies in India, which give rise to very great practical difficulties in the way of allowing private companies to undertake many great enterprises in India, which they do undertake with great advantage in this country; that there are very large classes of works for which in this country we rely upon private enterprise to achieve which must be undertaken by the Government if India. I believe it is right that they should be undertaken, but when they are so undertaken I think you must be especially careful to test the proposals of your engineers, and not to allow yourselves to be carried away by speculative estimates of the profits you are likely to derive when those estimates are not sufficiently well founded, because where you

Chairman—continued.

have not the test of being obliged to go to the money market to induce people to advance their money you are very apt to be carried away by those speculative estimates of speculative engineers. Therefore, in that respect, you are to a certain extent between Scylla and Charybdis. If you allow companies to make the works you get into difficulties, and if you allow your own engineers to make the works, not having the test of the market, they are perhaps apt to carry you too far. I think that carefully considering the matter, you must look to commercial returns, but at the same time you must necessarily, and to a certain extent you may justifiably, take into account the indirect benefit to the country both in the shape of increased land revenue and in other ways. Then again, I think that there is a necessity for double care, because there is a very great tendency to exaggerate those indirect benefits, and you must be very careful that you are not carried away by the idea of indirect benefits into constructing works which may disappoint you hereafter. Especially, I would again say, that in respect to irrigation works, it is extremely necessary that the subject of the exhaustion of the soil, and the subject of the unhealthiness caused by those canals should be exhausted before you go too far in carrying on a system of this kind. In respect of those works of irrigation, I think I may say that it is a result which is absolutely certain, from all the local inquiries that can be made, that you can only protect very limited areas by irrigation. I do not doubt that if you could have irrigation works extended all over India, all India would be protected from famine, but, as a matter of fact, if you look at the map and see the parts which are coloured green, you will find that the areas which are irrigable are only of comparatively small extent, and that there still must be a much larger extent of country which is not so protected. In respect to that large country, I think that you must depend as a security against famine, and other calamities, upon the improved means of communication of which we have heard so much, and that being so, I think you may very well make railways provided that you have really sure reason to believe that you may obtain from them a moderate return. For instance, I think in any question of a railway running through a populous part of India, which would clearly be a great benefit for commercial and other purposes, if you could quite ensure an early return of say 3 per cent., you might be justified in relying upon the indefinite and indirect advantages of that railway to recoup you for the 1 per cent. additional which it would cost you to borrow the money in order to make that railway. The same rule may to a certain extent be applied to irrigation works; but then you must consider with regard to those works, that whereas railways have no drawback whatever, whereas the profit is all clear profit, the direct profit is tangible, and the indirect profit whatever it is has no drawback, on the other hand, irrigation works are attended with considerable drawbacks with respect to health and otherwise, and therefore you are not so sure of them as you are in the case of railways. Then, I believe that there are some exceptional cases of great roads, and harbours, and other works which are not expected to make any direct return, and yet which are so extremely necessary, and so extremely benefical, that it may be justifiable to borrow for the purpose of making them. But with regard to such works, I think that you must be what I may call super-careful; and that it is only in very rare instances that you would be justified in making such works from borrowed money. If you do make them I think that you must avoid on the one side the old system of making them by driblets, that is to say, you must make up your mind to make them; you must calculate the cost; and you must get your money; and you had better, having once begun, make them as quickly as possible; but, on the other hand, you must not launch out into extravagance; and in every case, as I have already said, I think you ought to establish a sinking fund by which the capital may be repaid within a certain number of years from the ordinary revenues of the undertaking or of the country. An idea has sometimes struck me that inasmuch as the difficulty of deciding upon these questions is so great, and as the Government, both in India and in England, is too apt to be carried away by those waves of public opinion to which I have alluded, it might possibly be desirable to establish some kind of special tribunal to which plans for the expenditure of very large sums of money might be referred, in order that that tribunal might decide whether the conditions are such as to justify the expenditure in accordance with certain general principles laid down beforehand. For instance, it has occurred to me that, though it might be difficult to get a Committee of this House to undertake a function of that kind, there are some of the best men in England who have had the greatest experience in India, who are in the House of Lords, and who, by the law of the country are excluded from the India Council, and that men of that kind might be induced to serve on a tribunal such as that which I have suggested.

Chairman—continued.

Sir *G. Campbell*, M.P., K.C.S.I.

23 May 1878.

I would add, that I am very much of the opinion that in order to find the means of meeting famines when they do occur, and of reimbursing the cost of those public works which are rendered necessary by famine, a sort of insurance fund should be provided from the revenues of India, that is to say, a surplus should be established in ordinary years upon those revenues from which a fund should be created applicable to meeting the demands which may arise in the future, or to repay money which may have been borrowed for such purposes in the past. That plan seems very like what has recently been done by the Government of India; but it seems to me that there is this great flaw in the plan of the Government of India, that the money is not kept in a separate account. I think that you should altogether distinguish revenue, from money which is borrowed for the purpose of constructing public works. My plan would be that you should create a sort of trust, and that the money which is set apart from the revenue for the purpose of meeting the cost of famines, should be placed in the hands of that trust, and that trust should be empowered to lend the money for the purpose of public works in all cases in which sanction has been given for the constructing of those works by means of borrowed money. At the same time we must also remember that very large charges have been incurred in past famines, and that it still remains to pay off those charges; and I do not see that those charges can be paid off if the money which is saved from the revenues of ordinary years is

Sir *G. Campbell*, M.P., K.C.S.I.

23 May 1878.

Chairman—continued.

immediately devoted to public works, which I understand is the plan proposed. It must also be remembered that whatever you may do by means of public works, or otherwise, to secure the country against famine, still when the famine comes, you must expend a very large sum of money in either giving the people relief in the shape of labour, or in other ways, for the purpose of keeping them alive, and therefore you must, under all circumstances, make provision for that necessary expenditure during famine.

There is only one more word which I have to say, and that is on a subject which is somewhat connected with the subject before the Committee, I mean the mode of borrowing money for public works and other purposes. I am very strongly of opinion that the policy and advantage of borrowing money in India is so great and the disadvantage of increasing your debt in England is so great, that even at some disadvantage in other respects we ought to borrow as much as possible in India. I have been impressed with the idea that there are many small people in India who would be willing to lend their money to the Government if sufficient facility was afforded for them to do so, and that in fact in former days they actually did so to a much greater extent than at present under the system of what was called open loans; that is to say, when the Government, being in want of money, were willing to receive that money at a moderate rate of interest in very small sums at every treasury in the country. You have now

Chairman—continued.

superseded that system by another system copied from the English system under which facilities are not given to persons having a small amount of money to lend, but contracts are made with great bankers. My opinion is that the practical effect of that system has been to throw the loans, for the most part, into English hands, and to take away from the people those facilities for lending their money to the Government in a small way, at every small station in the country, which were formerly afforded. I am very strongly of opinion that if we are to borrow money for public works, efforts should be made to borrow that money in India and not in England.

1869. From your general evidence, I suppose I may assume that you are in favour of continuing the present system of carrying on public works; but that it would be adverse to increasing them to such an extent as to put an annual additional charge upon the revenue of India, so as to create in any way the necessity of increasing the taxation?—I am not prepared to say that, absolutely. I think it is quite possible that there may be classes of public works which would justify some increase of taxation. I am inclined to think that as the country becomes civilised, and has greater means of bearing the burden put upon it, due to modern and more civilised appliances, it may be possible and proper that it should bear greater burdens, and that the taxation, to some extent, might be increased to pay for those appliances.

Thursday, 30th May 1878.

MEMBERS PRESENT:

Mr. Agnew.
Mr. Balfour.
Sir George Campbell.
Mr. Childers.
Mr. John Cross.
Mr. Grant Duff.
Mr. Fawcett.
Lord George Hamilton.
Mr. Hardcastle.
Mr. Sampson Lloyd.
Mr. Ernest Noel.
Mr. Onslow.
Mr. Pease.

LORD GEORGE HAMILTON, IN THE CHAIR.

Colonel JAMES FIFE, called in; and Examined.

Chairman.

1870. THE Committee were anxious to have some specific information regarding irrigation works in Bombay; will you have the kindness to state to the Committee what position you held in the Public Works Department in Bombay?—I have been upwards of 30 years engaged in public works altogether, nearly 30 years of which have been principally given to irrigation. My first appointment in irrigation was in Upper Sindh, where I was for five years. I was afterwards employed on the Eastern Narra in designing works. I was subsequently made superintendent of canals in Sindh, and I had the whole of the works to look to; I was afterwards employed in the Deccan, in, I may say, introducing irrigation there on a larger scale than had hitherto been practised. I was then appointed chief engineer in Sindh, and finally I was appointed chief engineer for the whole of the irrigation works in Western India, and in fact I was the adviser to the Government of Bombay latterly on all irrigational questions. I was also employed on committee duty on the Godavery navigation works, and also on the Ganges Canal, at different times.

1871. At what date did you resign your last post?—I was chief engineer and under secretary to the Government, and I may say that I still stand so appointed; I came to this country on furlough two years ago

1872. Therefore your experience is quite recent?—Yes.

1873. The climate and physical conditions of Sindh very much vary from those of other parts of the Presidency of Bombay; perhaps you would be kind enough to give the Committee first your Sindh experience as regards the character of the irrigation works, and then subsequently their results?—After what Sir George Campbell has informed the Committee on the subject of rainfall, it is unnecessary for me to say anything more than that Sindh is a rainless country. The part of the country which is cultivated, and I may say inhabited, is an alluvial plain formed by the Indus. Traces of old channels may be found in every part of the country; channels which have probably ceased to flow from the accumulation of silt in them. The present

Chairman—continued.

state of the country is this: there is one large main channel of the river flowing down through it, and a few branches in the delta breaking out from it as it flows into the sea; but in all the upper part of the province there is but one main channel; like all alluvial countries the flood level of the river is higher than the level of the country; and, in fact, the river channel may be said to rest between the crests of two glacis sloping down on each side. The slope from the river bank towards the interior, is generally at the rate of about six inches a mile; the slope of the river itself averages through Sindh about seven inches a mile; the country to the eye is apparently perfectly flat, but there is that slight slope, which can only be detected by an instrument; the river, as you have been already informed, I think, is supplied from the Himalayas, and its volume is enormous. During the inundation period, that is to say, during the summer period, when the snows on the Himalayas are melting, its discharge is about 400,000 cubic feet per second, and even in the low season during the winter, when the snow ceases to melt, and when the river is reduced to its minimum, the discharge is never less than 70,000 cubic feet per second; I am referring to the Indus in Sindh, where there is only one channel. The river rises in May as the summer heat comes on; it attains its maximum in August, and subsides again to its ordinary level by the beginning of October; the inundation period is considered to last about four months. The canals, when Sindh became British territory, consisted entirely of channels, whose supply was dependent upon the rise of the river; that is to say, the cills of those channels were, as a rule, considerably above the low level of the river, and consequently, until the river began to rise during the inundation, no water entered the canals. With the exception of a rocky place at Sukkur, and some rocky ground in the vicinity of Jerruk, near Hydrabad, the river flows through alluvium, and so soft are its banks, that the process of destruction, we may say, never ceases. The river is perpetually tearing down one bank and building up new land opposite; this process goes on throughout the whole year; even when the river is at its lowest,

Colonel *J. Fife.*

30 May 1878.

Colonel *J. Fife.*

30 May 1878.

Chairman—continued.

the banks are continually torn down; as much as a mile of land may be taken away in a year from one side, and as much new land built up on the other. The river water is heavily charged with silt during the inundation period, one part out of 250 of the water being solid matter; during the low season about one part in 500 is solid matter. The enormous quantity of silt in the river, and the situation of the mouths of the canals on the soft bank, lead to great difficulties in keeping the canals open. The stream, owing to the want of slope, is extremely sluggish in the canals, and the deposit of silt is heavy; and besides this, the canal mouths are continually liable to be torn down, and enormous quantities of mud thrown into them; the clearance of the canals each year is a very serious operation. Before Sindh became British territory, the work was done by statute labour; the whole of the agricultural population on each canal were forced to turn out and labour on the canals until they were thoroughly cleared. That system was open to great objections, and under the English administration it was superseded by one of payment for labour; the work has been better done, but it has, of course, become much more costly. Before the change was made, the clearance of the canals used to cost about 12,500 *l.* per annum; it now costs about 70,000 *l.* per annum.

1874. Do the canals now irrigate a much larger area than they did before?—I should say they irrigate one-half more than they used to do.

1875. Still the cost of maintenance, or clearing them, is out of proportion to the increased area?—Yes, it is out of proportion to the increased area; speaking not of the actual work done, but of the cost only; because the work done formerly was very much the same as work done now. The canals were not in such good order as they are now, and the silt deposits in many places were much heavier than they are now; so that I should say, so far as the actual work goes, the quantity of work done now does not differ greatly from what it was when statute labour was employed. The inundation is by no means the same each year. The maximum generally occurs in August, but the maximum is not always of the same height, and very often during the inundation season there are serious fluctuations in the level; and whenever those fluctuations take place the supply of water in the canals is materially affected; it becomes less or more according as the river falls or rises. The canals have no sluices to their heads, the reason being, that it is impossible to work a sluice near the river on account of the danger of its being carried away, and you cannot place it any distance from the river, because if you closed its gates, or partially closed them, to prevent too much water coming into the canal, the portion of the canal between the sluice and the river would inevitably close up, from the deposit of silt; therefore, except in particular cases, which I shall mention presently, there are no sluices to the heads of the canals in Sindh. Their supply of water is entirely dependent upon the rise and fall of the inundation. If we have a heavy inundation we have too much water, and if we have a bad inundation we have too little. Those changes in the inundation affect the revenue considerably. We have had occasionally a loss of 20,000 *l.* or 30,000 *l.* out of 250,000 *l.*, in consequence of a bad inundation; and that loss by no means represents the real loss to the country; it merely represents the loss of Government revenue. The loss to the people is probably three time as much.

Chairman—continued.

1876. But those inundations would take place, would they not, whether there were irrigation canals or not, from the natural overflow of the river?—Yes; I have been describing the excess of water in the canals, not floods. There are portions of the country which are liable to inundation, especially the left bank above Rohree, and of late years, unfortunately, the right bank on the opposite side. These have caused great destruction. About three years ago we had an extraordinary inundation, the greatest which has occurred, I believe, during the present century, and the destruction of property and loss of crops and revenue were very large indeed. It has been observed, with regard to the canals, that the large ones are the easiest to manage, the current in them for a given slope being much swifter than in the small ones, and consequently they are not nearly so liable to choke with silt. We have them of all sizes, from four feet wide, a mere cut at the river's edge, to channels 150 feet wide.

1877. Then I assume that without irrigation in that part of India cultivation would be impossible, and it is only that part of the country which is irrigated which is cultivated?—The inundated tracts are cultivated after the subsidence of the inundation, and they bear a wheat crop, but unless the country is either irrigated by canals, or inundated by direct overflow from the river, it lies uncultivated, and it produces nothing.

1878. You say that the area under irrigation has increased during a certain period by about one-half; has the area under cultivation also increased in like proportion; that is to say, is a larger portion of the ground which is inundated cultivated now than before?—I think not; I think that the area of cultivated land on inundated ground is very much the same as it used to be, and that the increase in the area of one-fourth, which I have mentioned, is due entirely to the canals.

1879. Has there been a considerable or any increase in the population during the last 25 years?—I think there has been an increase in the population, according to the best information which we have, of about 20 per cent. That has been obtained partly by immigration, and partly by better government since the British occupation. When we took Sindh there was no security to life or property, in a great part of it at least.

1880. Having described the system of irrigation, would you now inform the Committee how the cultivators pay for the water, whether they pay for it directly in the shape of water rates, or whether it is included in the land revenue?—The payment of the cultivator is entirely under the head of Consolidated Land Revenue; there is no separate payment.

1881. How is the amount to be paid arrived at under this head of Consolidated Land Revenue; that is to say, of what items is the Consolidated Land Revenue composed?—It was decided, under the Orders of the Government of India, that an attempt should be made to separate the portion of the revenue which was due to the land from that which was due to the water. It was frequently stated by the Bombay Government that the revenue was entirely dependent

Chairman—continued.

pendent on the water, but it was thought, after some consideration, better to make some sort of division between the two, and therefore a proportion was arbitrarily fixed; from 5 to 10 per cent. of the revenue was allowed to be due to the land, and the remainder, 90 to 95 per cent., to be due to the water.

1882. Have you any estimate of the capital that has been expended in Sindh in constructing those irrigation canals?—Yes; but if you will allow me I will state what the works are. The canals which afford the greater part of the irrigation in Sindh, and which are most satisfactory, are of considerable size, and they have been very much improved since our occupation of the country commenced. Beginning at the north, we have the Desert Canal; this is entirely a new work; it is now 50, and when completed will be 80 miles long; it is about 50 feet wide, and will carry about 1,500 cubic feet per second. The Bigari Canal was originally about 40 feet wide and 60 miles long; it has been greatly enlarged and extended, and it is now 100 miles long and 70 feet wide, and has an average discharge of about 2,500 feet per second. The Sukkur Canal, the greater part of which is new, is 70 miles long and 40 feet wide, with an average discharge of 1,500 feet per second. The Gharr Canal is 100 miles in length, 70 feet wide, and has a discharge of about 3,000 feet per second. The Fullaili, which has been improved with new head works to increase the supply of water, and an extensive improvement of the Main Canal, is about 100 miles long, 150 feet wide, and now carries about 4,500 feet per second, or nearly as much as the Ganges Canal; but this large supply only lasts for four months; it afterwards becomes comparatively small. The Eastern Narra Canal, a new work, is 150 feet wide, and discharges about 12,000 cubic feet, or twice as much as the Ganges Canal; but the portion of the canal which has these large dimensions is only 12 miles in length. Beyond the 12th mile the work done consists in the improvement of an existing forsaken channel of the Indus. About 150 miles of this old channel have been improved by excavation, by dams, to close the branches which would have allowed the water to run to waste in the Eastern Desert, by embankments to prevent overflow, and by branch canals to distribute the water for irrigation, one of which is 90 miles long, and about 50 feet wide. The capital outlay in the Sindh canals is 667,704*l.*

1883. Is that the total sum which has been spent since the British occupation of Sindh, or does it merely include the money which has been borrowed for purposes of irrigation?—It includes the whole expenditure under the British Government upon new work, on new canals, or improvement to old ones. It comprises, in fact both Ordinary and Extraordinary Grants.

1884. Have you ever attempted to estimate the value of the native works which have been taken over?—I have done so, roughly; I should say that, valuing the works as they existed when we took the country at a price which similar works would now cost us, their value would be, I may say, two millions in Sindh alone.

1885. What revenue is derived from those works? — The Consolidated Revenue was 240,000*l.*; not of the whole province, but what was actually due to canals; I have not included

Chairman—continued.

the revenue derived from the land which was inundated, but merely what was actually irrigated.

1886. In what year was that?—In 1853. We took the country several years before, but those are the figures; I do not think that the revenue varied greatly from the time we took the country up to 1853.

1887. What was the last return of the revenue in the same district?—The last statement which I saw before leaving Bombay, showed a revenue of 340,000*l.* Those figures which I am giving you, I should say, are the land revenue figures; the division which was arbitrarily made between land and water, is not comprised in those figures. That does not very much affect the amount of increase; it affects, of course, the figures, but it does not make much difference in the increase.

1888. Have you ever estimated what percentage return these irrigation works give upon the capital?—I make out that the works, so far, have paid 15 per cent., taking them altogether, or a capital outlay of 667,000*l.* has produced 100,000*l.* a year.

1889. But then you do not take into account the value of the native works?—Yes; I merely take the increase of revenue.

1890. But a certain part of that increase might be due, not to the works that we constructed, but to older works which were in existence when we annexed Sindh?—I have given the old works the credit of the revenue which was derived from them, and I have merely taken the increase which has occurred since the improvements were effected.

1891. Which increase you consider to be mainly if not entirely due to the works which we have constructed?—Yes.

1892. General Dickens, in his evidence, told us that in the greater part of India irrigation works do not begin to be remunerative until they have been in operation some 12 years; have you ever made a calculation of what period in Sindh is necessary for an irrigation work to give a good return, or to pay upon the capital outlay?—Speaking of Sindh only, I may say that the return is immediate up to 5 per cent., the water is used as fast as ever it can be delivered in the canal, and the only thing that is necessary, is that the works should not be carried on too fast, in order that the people may have time to prepare for it. We have two instances of new works in Sindh: one is the Desert Canal, the first work that I mentioned; upon that work expenditure is going on now, and although the work is only half made, yet it is more than clearing its working expenses. If they stopped the expenditure for a year, so as to allow the capital that was last spent to work out its full effect, without any further encumbrance, it would produce 5 or 6 per cent. at once. In the other case, that of the Eastern Narra, that work has been paying 5 or 6 per cent. for many years.

1893. Then Sindh is a country which, with the single exception of the silt, is exceptionally favourable to irrigation, cultivation being impossible without water?—Undoubtedly. Perhaps I may add, that from calculations which I have made of the cost of the Bigari Canal, as we originally found it, and the revenue derived from it before any large expenditure was incurred to improve it, I find that such a work pays 20 per

Colonel *J. Fife.*

30 May 1878.

Chairman—continued.

cent. on the cost of its construction; that is to say, it pays 20 per cent. after the irrigation upon it has become fully developed.

1894. And in how short a period?—That I cannot say; I have merely taken the canal and its revenue as we found them, and valued the work at fair rates, and that compared to its revenue has led to that conclusion, that 20 per cent. may be assumed as the return which may be derived from a canal of that description.

1895. In that calculation during the earlier years of the canal, you do not add compound interest on to the capital amount, assuming that the receipts do not equal the interest and the working expenses?—No, I have allowed no loss for interest.

1896. Do the people who live near those irrigation or inundation canals suffer much from illness?—No, they do not. The only parts of Sindh where we find much sickness are those in which there is complete inundation from the river, where there are heavy floods in fact. When those floods subside, there is a good deal of fever, but we have no sickness produced on the canals by irrigation.

1897. Have you to complain of that saline efflorescence called the *reh*, which has done so much harm to the North West Provinces?—I have observed it in Sindh, in many cases on the immediate bank of a canal, and also close to the river where the ground has been made very damp by proximity to the water; but it never extends to any distance, and it only makes its appearance on land which is unirrigated. In the North West Provinces, I think the *reh* has been increased by the lightness of the soil, which, of course, favours evaporation from the surface. In Sindh the soil is of a closer nature, and I have never seen any injury done to the land from efflorescence.

1898. When you say that it chiefly appears in land which is unirrigated, do you mean land which is uncultivated?—Yes.

Mr. *Onslow.*

1899. What is the exact meaning of the term *reh*?—It is a word which is used in the North West. In Sindh we call it *shor*. It simply means salt.

1900. Is "reh" a Hindostance word?—Yes.

Chairman.

1901. What has been the average annual expenditure upon capital during the last few years in Sindh upon these canals?—I should say it might average 50,000*l.* of capital expenditure, exclusive of repairs.

1902. That is to say, 50,000*l.* has been annually applied to the canals?—Yes, to such works as I have been describing, and to improvements. I should have mentioned, in describing the works, that the new ones which we have constructed have generally aimed at a better and more certain supply of water. The Eastern Narra Canal and the Sukkur Canal have their heads placed at a spot in the river where there is a rocky barrier, and where no change ever takes place in the channel; consequently the heads of those canals have been furnished with sluices, and their supply is not so dependent upon the rise of the river as the other canals, and, in fact, is so certain that we can command sufficient water during even the most unfavourable inundation.

1903. Would you advocate a larger annual capital expenditure than 50,000*l.* as likely to be remunerative?—I think a very much larger sum could be advantageously laid out in Sindh. There is a great deal to do yet to render the supply of water more certain. The system of deriving a supply from points in the river where no change takes place could be extended, and I should say that, with the present population, supposing that there were no more railway works to construct in Sindh (the present railway is nearly complete there), the sum which could be laid out profitably would be about 250,000*l.* per annum.

1904. And you think you would have as good a return from this increased outlay as you have had upon the works which have been already constructed?—No; I should not expect at the commencement, certainly, more than 5 per cent. upon this new outlay, because it would be upon work which is almost entirely new, and consequently we should have to wait, as we have always to wait in the case of new works, to give the people time to develope the irrigation.

1905. You spoke of improvements which have been made to counteract the uncertainty of the supply; can you ever recollect a year in which the supply of water in the Indus partially or totally failed?—There is scarcely a year during which it does not fail at some period; that is to say, it fails when the people are busily irrigating, and the quantity of water in the canal is diminished at a time when full irrigation is necessary, but I have never known an inundation to fail entirely.

1906. Have you ever known an instance of any famine or great scarcity of food occurring through want of water?—About four years ago there was considerable distress which was caused by a heavy flood which destroyed the standing crops and numerous villages; and I think about 50 years before that a great deal of distress was caused by a flood of a similar description being followed by a very bad inundation. Those are the only cases in which I have heard of there being any great distress in Sindh.

Mr. *Hardcastle.*

1907. By a bad inundation, do you mean an insufficient inundation?—Yes, an insufficient inundation, and a varying one. Instead of the steady rise beginning in May, the river sometimes rises suddenly, and throws a great quantity of water into the canals when a great quantity is not wanted, and that entails leaving the canals encumbered with silt, and less equal to the work which they have afterwards to do for the rest of the season.

Chairman.

1908. The evidence which you have given applies, does it not, to the whole of Sindh?—Yes, to the whole of Sindh.

1909. Do you wish to make any further remark, or have you any other opinions to offer as regards the system of irrigation in Sindh?—I think that by constructing works with their heads located at points where the river does not change, and obtaining in that manner a supply of water which will last for two crops in place of one crop during the year, a very much larger area might be irrigated, and a larger revenue produced than we have now. The expense to the cultivator at present is very large, from having to raise the water and dig out his field channels, which are very

Chairman—continued.

very liable to silt up. The cost of raising the water by a Persian wheel, is about equal to the assessment which the cultivator pays to the Government; and by improving the system of irrigation, that large expense might be got rid of, and the labour which is now employed to raise the water could be applied to the cultivation of new land.

1910. Having finished your remarks as regards Sindh, would you be kind enough to give to the Committee similar information concerning the other part of the Bombay Presidency which is commonly known as the Deccan, because, I suppose I may assume that there are no irrigation works on the western side of the Ghats, and that therefore your experience is almost exclusively derived from the tract of country east of the Ghats?—Yes, there are one or two works in Guzerat, but the portion of the country on which I have been principally employed where irrigation I may say is most needed, is on the eastern side of the Ghats.

1911. Are there no irrigation works of any size in Guzerat, or in Kattiawar or in that part of the country?—No, none; we have constructed one new work, but it cannot be called a large work.

1912. Is the supply of rain generally sufficient in those districts?—The supply of rain is better than it is in the Deccan.

1913. Is the population sparser, or the reverse?—The population is large in Guzerat.

Mr. *Onslow.*

1914. Irrigation is hardly needed between the Western Ghats and the sea coast; practically there is no country at all running down to the south of Bombay?—No, the rainfall in the northern part of Guzerat is about 25 inches, but south of Bombay it is very large indeed, from 70 to 90 inches, and there, of course, irrigation has not been thought of.

Chairman.

1915. In the Deccan will you describe to the Committee what the climate is, or if you agree with the evidence which Sir George Campbell gave upon that point, perhaps you will say so, and also describe the class of work which has been constructed in that part of the country for irrigation purposes?—Sir George Campbell has already explained to the Committee the manner in which the south-west monsoon strikes the western part of India. I need only point out the portion of the country in the Bombay Presidency where the rainfall is least, and where the irrigation is consequently most needed. At the crest of the Ghats the rainfall is, perhaps, 200 inches or more. At Poonah, 25 miles inland, it is only 25 inches. At Indapore, which is, perhaps, 50 miles inland, it is only 14 inches. From Indapore the fall gradually increases until at a distance of about 100 miles inland it becomes 28 inches as at Sholapore. There is therefore a comparatively dry tract between Poonah and Sholapore, in which the rainfall varies from, we will say, a minimum of 14 inches to a maximum of 25.

1916. Does the north-east monsoon reach any part of the Bombay district?—I think it reaches Sholapore; at least we observe that they get more rain at Sholapore during the north-east monsoon than they do at Poonah. It falls differently; it falls in heavy showers.

Chairman—continued.

1917. You have probably seen the rain map which is contained in this Statement of the Moral and Material Progress of India; according to this map the whole of the interior of the Bombay Presidency east of the Ghats has an insufficient annual rainfall for purposes of cultivation?—During favourable years and where the soil is deep, the rainfall is sufficient, but on the average I should say that the rainfall is insufficient.

1918. What are the class of works which have been constructed there for irrigation purposes; are they at all similar to those which you have described as existing in Sindh; perhaps you will describe first those which we have constructed?—I have stated what the rainfall is, and I may now say that the country is rough and rocky, full of deep valleys, and traversed by numerous rivers; the soil is thin, except in the lower parts of the valleys, where it has accumulated. The formation is trap. The springs are very few and not very abundant. Well sinking is speculative; a man may or may not find a spring. I have known cases where after sinking a well through the solid rock to the depth of 70 feet, the task has had to be given up; no water was reached at that depth. There are very few old irrigation works in the Deccan; they consist principally of the small channels that lead off a stream from a river to a small area of highly cultivated land. There are very few tanks indeed. In Dharwar, which is the southern part of the Deccan, there are a good many tanks. They are principally for rice cultivation, similar to the cultivation in Madras, and they depend upon the local rainfall for their supply. The country in Dharwar is more favourable than the Deccan generally for that description of work, because the slopes are not so steep; it is a gentle undulating country. Small as they are, however, the irrigation works in the Deccan are extremely valuable, the irrigation carried on by means of them being of the very finest kind. The triennial rotation of crops, sugar cane, rice, and wheat, is practised on the best of them; and the rate of assessment under these conditions is in some cases as high as 18 rupees per acre, of which 16 is considered due to water, and two to land, that being the assessment which the land would bear supposing it were not irrigated. There are the remains of a few old ruined tanks about the country, the history of which is not very clear, but so far as we can ascertain, they appear to have failed from an uncertainty or deficiency of supply of water. One of the most important things which attracted our attention when we commenced to examine the Deccan, was this uncertainty of supply, and we therefore, in submitting plans for new works to the Government, endeavoured to select as much as possible places where we were sure of our supply of water. With the exception of one work called the Ekrook tank, all the large and new works constructed derive their supply from streams fed from the Westerns Ghats. The Ekrook tank has so large a catchment basin, that although its supply is dependent upon local rainfall, still, during the worst season that we have ever known, it held a very large quantity of water; in fact sufficient to have lasted a second season, had the second monsoon also failed.

1919. Was that the case in the recent famine?—Yes, it was so during the famine.

1920. Perhaps you will state to the Committee what

Colonel *J. Fife.*

30 May 1878.

Chairman—continued.

what are the largest and most important works which have been undertaken by the British Government in the Deccan?—The new works which have been constructed by us are the Hathmathi Canal, 20 miles long, and the Hartala Tank, an old work restored.

Mr. *Fawcett.*

1921. Was the first one entirely a British work?—Entirely a British work. In the case of the Hathmathi Canal, there is a weir 1,000 feet long and 22 feet high, and the discharge is 291 cubic feet. Of the Hartala Tank, the capacity is 140,000,000 cubic feet. The Mukti Tank dam is 2,770 feet long, 65 feet high, and its capacity is 368,000,000 cubic feet.

Mr. *Onslow.*

1922. I presume you mean the maximum capacity?—What the tank will hold.

1923. Does it ever hold that amount which you specify?—Yes.

Mr. *Balfour.*

1924. Was the last entirely a British work?—Yes, entirely.

Mr. *Hardcastle.*

1925. Do those tanks get full every year if you have a good rain?—Yes. Then there are the Jamda Canals, which are two canals of 27 and 18 miles long, supplied by a weir 1,540 feet long and 18 feet high; the Palkher Canal, with a weir 800 feet long and 20 feet high; the canal is 11 miles long and it discharges 80 cubic feet. The Wadali Canal has a weir 655 feet long and 9 feet high; the canal is 8½ miles in length. The Ojhar Canal has a weir 830 feet long and 29 feet high; the canal is 10 miles in length, and the discharge is 125 cubic feet. The Lakh Canal has a weir 1,500 feet long and 15 feet high; the canal is 21 miles in length and the discharge is 182 cubic feet. The Bhatodi Tank has a dam the length of which is 2,400 feet, and the height 50 feet, with a capacity of 149,000,000 cubic feet. The Mutha Canals, are two canals, one of which is 99 miles in length, with a discharge of 412 cubic feet; and the other is 14 miles in length with a discharge of 38 cubic feet. There is a dam and waste weir 5,136 feet, or nearly one mile in length, and 99 feet high, and the capacity is 5,226,000,000 cubic feet. The Kasurdi Tank is a small one, the capacity of which is 14,500,000 cubic feet. The Koregaon Tank is another small work restored, but the original dam was so badly made that the work is unsatisfactory. The Ekrook Tank has a dam 7,000 feet, or nearly one and a half miles long, and 76 feet high; the capacity is 3,350,000,000 cubic feet. It has three canals of 26, 18, and four miles long, discharging 70, 60, and 25 cubic feet. The Rewari Canal is a small work four miles long, discharging 16 cubic feet. The Yerla Canals, are two canals, each nine miles long, with a weir 538 feet long and 16 feet high, discharging 42 cubic feet. The Gondoli Canal is eight miles long, with a weir 325 feet long and 24 feet high, and a discharge of 10 cubic feet. The Mayni Tank has a dam 2,870 feet long and 57 feet high; and a canal 10 miles long and a capacity of 190,000,000 cubic feet. The Chickli Canal is six miles long, discharging 15 cubic feet. The Krishna Canal is 32 miles long; it has a weir 1,200 feet long and 21 feet high, and a discharge of 140 cubic feet. The Madag Tank is an old work utilised, and it has two canals of six and eight miles.

Mr. *Hardcastle*—continued.

Chairman.

1926. Could you tell the Committee what capital has been expended upon those works?—The capital outlay, including all charges, is 1,080,438 *l.*, the whole of which has been expended during the last 13 years.

1927. Are those works pretty evenly distributed throughout the various collectorates?—Yes, they are pretty equally distributed.

1928. Are any of those works in the collectorate of Poonah and Ahmednugger?—Yes.

1929. What return do you estimate that those works at present give?—I should explain that some of those works were partially opened about 11 years ago, that is to say, two or three years after their commencement; others have only been in operation, that is to say, partially open, for two years; but taking them all together, the result is that the receipts in 1876-77, that is the latest year up to which I have any figures, a little more than cover the working expenses, about half per cent.

1930. How do they pay for this water; do they pay for it in the shape of water rates or in the shape of land revenue?—We have distinct water rates.

1931. Does this return include anything else except the water rate?—There are two small sums included for enhancement of land revenue, but they are very small, only 59 *l.* and 14 *l.*, two items hardly worth mentioning. I may say that the enhancement of land revenue was not taken into consideration at all when these works were projected.

1932. Is the return which you have given a fair return of the loss or profit on the works?—I think that some of the charges which have been debited to the works are open to question. The charge for Public Works establishments is excessive. Some 10 years ago, when it was intended to prosecute irrigation works vigorously, the establishments were strengthened, and of course our expense greatly increased. Four or five years afterwards the expenditure on new works was restricted, and then the cost of those establishments was debited against works which are in operation. Consequently, there are cases in which the repairs of a canal cost, say 50 *l.*, and the establishment for looking after that canal costs 200 *l.*

1933. Then was the establishment employed in any other work?—No, there was nothing for them to do, the construction of new works having been checked. If the construction of new works had continued without interruption, then the establishment would have been fully employed.

1934. When did this sudden check take place in the continued construction of irrigation works?—About five or six years ago; I cannot give the year exactly.

1935. Then the establishment having been formed on the assumption that a very large expenditure was to take place, it was impossible to reduce them, and so the works that are in operation had too heavy an establishment to maintain?—Yes, precisely so.

1936. Is

Chairman—continued.

1936. Is that the state of things now, or has the establishment a little more to do now?—In consequence of the large number of new works having been commenced as relief works, during the late famine, the establishment has been fully employed, but unless something is done to increase the fund placed at the disposal of the Bombay Government for new works, the same thing will occur again, and the charge for the establishment will become excessive. There is also another item which I had wished to mention. The charge for collecting the revenue is excessive. It amounts generally to about 20 per cent. of the revenue collected, and in one instance it is 80 per cent. of the revenue collected. There are some charges which are fairly debitable to the works; for instance, from 3 to 5 per cent. is paid to village officials for collecting the revenue; and to those, of course, no objection can be made; but the remainder of the charge is for the permanent revenue establishment of the country; an establishment which existed previous to the construction of the works, and which is required for general administrative purposes. It is not an actual charge of, we will say, 15 per cent., which makes the whole amount up to 20 per cent., but is the result of a calculation, a rateable portion of the permanent establishment is charged against each item of revenue. And in the instance in which 80 per cent. is debited against one of the works the land revenue of the district had failed in consequence of the drought; consequently the per-centage upon collection was enormously increased, and the canal suffered, although really the expense of collecting the revenue on that canal was no more that year than it was any other year.

1937. Is this system peculiar to Bombay, or is it in force in other parts of India?—I understand it is the same in other parts of India, that the orders of the Government of India are that a proportion of the cost of the permanent Land Revenue Establishment should be debited against each work.

1938. And the per-centage due to establishment charges, so far as you know, is the same in Bombay as it is elsewhere?—That I cannot say.

1939. Is there a great difference between the returns of any of those works of which you gave us a list; do some pay better than others, or as a rule, do they not pay more than half per cent.?—Some works undoubtedly pay better than others; we observe that the works which have the richest population residing upon them answer best, and that works in the poorer parts of the country are not so successful; the irrigation is not so much availed of where the people are poor as where they are comparatively well off, even although the rainfall in the latter case is better than it is in the former.

1940. In which collectorate would you say that the ryots are best off in the Presidency of Bombay?—In the Sattara collectorate they are well off.

1941. Is the return greater in Sattara than in Poonah and Ahmednuggar?—In the vicinity of Poonah they are well off, but not to the eastward; at Sholapore they are poor, at Ahmednuggar they are poor, and in Indapore they are poor.

1942. How do you account for the richer districts taking more water than the poorer districts, although the rainfall is greater there?—Simply from their having better means. The irrigation requires a small amount of capital to be successful, and the people in the poorer districts are not only without capital, but they are overhead and ears in debt, and completely in the hands of the money-lender.

Chairman—continued.

1943. And therefore I suppose they do not care to take the water, because assuming that they grew better crops, it would be the creditors and not themselves who would derive the benefit?—Precisely; whatever the profit may be, it may be said that it must go to the money-lender; they can expect nothing for themselves from it.

1944. Then until something can be done to improve the condition of those people, I suppose there is not much prospect of irrigation works paying well in those poor districts?—Irrigation is gradually extending, but no doubt the wretched condition of the people must continue to delay the development of irrigation works to the full extent.

Mr. *Grant Duff.*

1945. How is it that the people of the Sattara collectorate are better off; is it better land?—They have a better rainfall, the land is better, and the soil is somewhat deeper than it is in Ahmednuggar.

Mr. *Ernest Noel.*

1946. Is it the same in Poonah?—At Poonah also (I am speaking, of course, of the immediate vicinity of Poonah), they have a better rainfall, and the soil is deeper.

Chairman.

1947. Is a large amount of capital now annually applied to the prosecution of irrigation works in Bombay?—During the recent famine the expenditure was temporarily increased, but at present I understand that it is very small, probably not more than 100,000 *l.* per annum.

1948. You stated that the amount spent in Bombay Presidency is about 1,080,000 *l.*, what will be the total cost of all those works when they have been sanctioned and when they have been completed?—The figures which I gave were for works which have been brought into operation, and are virtually completed, so that there would be very little to add to that sum.

1949. In fact many new works have not during the last two or three years been undertaken, except during the recent famine?—Just so.

1950. Famine labour, I suppose, is very expensive?—Very expensive indeed.

1951. In Bombay, I believe, at the commencement of the famine, a system of large works was at once organised, and they were continued under the control of the Public Works officers?—Yes.

1952. Therefore the works constructed by famine labour were carried out in Bombay under the most favourable circumstances?—They were.

1953. And still in your opinion they are very expensive, and more costly than works which may be executed under ordinary conditions in times of prosperity?—Undoubtedly.

1954. Will you state to the Committee why you are in favour of large gangs of people being employed upon large works during the time of famine, rather than smaller gangs under civil supervision?—The extreme difficulty of superin-

Colonel *J. Fife.*

30 May 1878.

Chairman—continued.

tending a large number of people of that kind in full work renders it, of course, very advantegeous to get the people as much as possible together, and also on large works like railways or canals, where you have long lengths of embankment or excavation, it is much easier for the supervisors who are over the works, to lay out and properly apportion each man's task. In small works it is not so easy either to apportion the task or to see that it is done.

1955. The special training and experience of the Public Works officers, I presume, enables them to snpervise more easily and control large bodies of men than civilians who, except during a time of famine, have not any special training or experience of the employment of large bodies of men?—Certainly it does.

1956. Considering that after an outlay of over a million in the Presidency of Bombay we have only a return of half per cent., would you still advocate the further prosecution of irrigation works?—Yes, I think that the result arrived at, although somewhat disappointing, that is to say, we anticipated that the revenue would increase more rapidly, is still sufficient to encourage us to go on. I think that as the revenue is now growing steadily every year, we may expect that in the course of 15 years from the first commencement of a work of irrigation, its return will reach 5 per cent. There is one thing which is encouraging on irrigation works, and that is that the working expenses do not increase in the same proportion as the work done. It makes very little difference whether 100 or 1,000 cubic feet per second are sent down a canal; the repairs and maintenance establishment are very much the same in either case. A larger number of men are required to distribute the water and attend to some of the details, but the chief expenses, the repairs and clearance of the canal and the head quarters establishment, are unaffected. I think that works properly designed in the Deccan will yield 5 per cent. in 15 years from their first commencement, and that they will ultimately yield 10 per cent.

1957. When they were first constructed it was assumed that they would almost from the moment that they were in operation be remunerative, that is to say, that they would more than pay their working expenses and the interest on the cost of their construction?—For the first year or two probably they will not pay their working expenses. I say that taking the average, the first 15 years after the work begins to irrigate, the average will be 2½ per cent.

1958. That is rather, is it not, the result of your recent experience; but when those works were sanctioned and the system of Public Works commenced, it was assumed that irrigation works of this description would pay much more rapidly than they have done?—Yes.

Chairman—continued.

1959. And it is therefore somewhat disappointing to find that those anticipations have not, as regards the Deccan, been realised?—Yes.

1960. You have told us that the establishments in Bombay were very much in excess of their requirements; who controls the provincial establishments; is it the local government or the Supreme Government?—The local government.

1961. What is the process; do the local government indent upon the Supreme Government for a certain number of engineer officers for a certain time, or do the Supreme Government, when they sanction a certain scheme which will involve a certain expenditure, hand over to the local government who is to carry them out a certain number of officers?—There is a scale sanctioned of officers, and it is filled up as occasion requires. There is a certain scale sanctioned by the Government of India of a certain number of officers for the whole of the department, and the local government fills it up according to circumstances as they require it.

1962. How is that establishment yearly recruited; a certain number of young engineers go out from Cooper's Hill; when they arrive in India are they at once divided and apportioned to the different presidencies and local governments?—I have not had any experience myself of the engineers from Cooper's Hill. Those who were sent out when I was in India, were sent out by the Secretary of State after passing an examination, and they were sent out on our application. We applied for engineers and they were sent out by the Secretary of State. In some instances when the engineers came out, we exchanged communications with the Government of India, and modified the proportion which was allotted to Bombay.

1963. Supposing anybody is to be blamed for the establishment in Bombay being so much in excess of its work, whom ought we to blame; is it the Supreme Government or the Bombay Government?—The Bombay Government increased its establishment, of course, to carry on the works which were then projected, on the understanding that funds would be supplied.

1964. Then the Bombay Government, I suppose, sent in a certain number of schemes for sanction; those schemes were sanctioned by the Supreme Government, and they then formed their establishment in the belief that a certain sum would annually be given them to prosecute those works?—Yes.

1965. The Supreme Government for financial reasons were obliged to curtail the sum, and the Bombay Government was left with an establishment very much in excess of what it wanted?—Precisely so.

Friday, 31*st May* 1878.

MEMBERS PRESENT:

Sir George Campbell.
Mr. John Cross.
Mr. Fawcett.
Mr. Hardcastle.
Sir Joseph M'Kenna.
Mr. Onslow.
Mr. Pease.

SIR GEORGE CAMPBELL, IN THE CHAIR.

Colonel JAMES FIFE, called in; and further Examined.

Colonel *J. Fife.*
31 May 1878.

Chairman.

1966. I UNDERSTAND that you have some additions to make to your evidence of yesterday?—In speaking of the probable future revenue from the Deccan works, I should have mentioned that the water rates at present levied are only about half of those current on the old works.

1967. Which old works?—The old works in the Deccan. Then, to show how fully the people appreciate the value of water, I may mention that they raise water from wells at a cost of 3 *l.* per acre per annum, for triennial rotation. In many instances where the canal water has come near the wells, the inhabitants have taken the canal water in preference; and under those circumstances they pay the garden-irrigated rate under land revenue, and they pay the water rate in addition. I should further wish to mention that I think it would be very beneficial to the works in future if in place of selling the water separately to each cultivatitor, were sold at each branch head to an irrigating community. When a work is first opened, and the people are unaccustomed to irrigation, it is necessary to deal separately with each man; but when they come to understand irrigation and the management of their field channels, I think it would considerably decrease the annual expenses, and it would make irrigation more popular if the arrangement I have mentioned was adopted. With regard to the sum which I said, I thought the Government could lay out with advantage in Sindh and the Deccan, I should mention that I consider it essential to success that the Government should know several years beforehand what sum it will have placed at its disposal. It is impossible to ensure economy and to adjust the establishment to the work to be done unless the Government knows for some years beforehand what the work requiring to be done will be. At present, we have sometimes 300,000 *l.* allotted by the Government of India; perhaps the following year it is reduced to 150,000 *l.*, and our establishment is of course with the latter sum only have employed. I spoke of the Bigari Canal as an instance of a remunerative work. I mentioned that it paid 20 per cent. upon its original cost, that is to say, upon what it would have cost us to construct in its original form. I should mention that the circumstances of that canal as regards construction are very favourable. The slope in that part of the country is nine inches a mile, and consequently the excavation to lead the water out on to the land was comparatively shallow, and the cross section of the canal to carry the requisite body of water forward is comparatively small.

Chairman—continued.

1968. Do you know the origin of that Bigari Canal?—I have no doubt it was done by forced labour. I gave yesterday what its cost would have been, supposing it had been constructed by paid labour; and I mentioned that it had paid 20 per cent. upon that cost; it would have cost our Government about 60,000 *l.*

1969. It is in reality an old native work?—I suppose it did not cost the Sindh Government anything; it was made by forced labour. Generally in Sindh the canals have a fall of only six inches a mile; in some cases it is only four inches a mile, and they are much deeper excavations than the Bigari Canal. That not only increases greatly the cost of construction, but also the cost of maintenance, because the want of slope causes the stream to be extremely sluggish, and consequently the accumulation of silt each year is very much heavier. In speaking of the enhancement of land revenue due to irrigation, I mentioned that that had not been taken into consideration when the projects of irrigation for the Deccan were first considered; but I should like to add, now that I think that some enhancement would be justifiable on account of the advantages which works of irrigation confer upon the country in their vicinity: First, we have security to the ordinary unirrigated crop; then there is an increase of certain valuable crops requiring a good rainfall, and which can be irrigated when the rainfall happens not to be abundant. We have observed in the Deccan that the crop of ground nut, a very profitable crop, is considerably increased near the canals. Then irrigation keeps down the price of grain and fodder in the vicinity of the work, and this is very important. Grain, of course, can be brought from other places to the people, but it is not so easy to bring fodder; and I have known an instance in which, though the people were not able to avail themselves of the water for a valuable crop like sugar cane, they actually paid the sugar-cane rate for water, and grew fodder on the land during a season of drought. Water also is brought in abundance by the canals to the vicinity of villages for domestic purposes, and for cattle. I know an

Colonel *J. Fife.*

31 May 1878.

Chairman—continued.

instance in Kandeish where the cattle had to be driven a distance of four miles every day to get their water. On the Ganges Canal the question of enhancement of land revenue was considered by a committee of which I was a member, and the conclusion that we arrived at was that, as that enhancement had been made on the understanding that the water rates would not fully represent the value of the water, and that as the water rates had actually not represented the full value of the water, therefore the enhancement might be regarded as legitimate canal revenue.

1970. Was that committee a committee of engineer officers?—It was a committee of engineers only. Colonel Anderson was one of the members of the committee, and Mr. Leonard was another. I should wish to make a remark about old and new works. There is an idea abroad that the only works which pay are native works, and especially small works; but the distinction which I should wish to be made is between old works and new works. Many of the old native works which I have seen have great merit, and especially when we remember that the men who constructed them were uneducated, and probably had no aid whatever from instruments; but, at the same time, those works are by no means perfect. The new works, on the other hand, have been constructed under great advantages, and they are certainly, as a rule, superior to the old ones; but the new works have not yet had sufficient time for their full development. There is one other remark I should wish to make about the present arrangement under which irrigation works are constructed in India. At present the Government of India is responsible for all outlay. I think Sir George Campbell, in his evidence the other day, mentioned that it would be very advantageous if the responsibility was thrown more upon the local government. I wish to say that I entirely concur with that view, and I think that any possibility of mismanagement might be prevented by requiring that all loan questions should be considered in the Legislative Council, and passing an Act like a railway Act in this country; but on this point I believe Sir George Campbell himself has already thought of some arrangement, and he is much more competent to deal with such questions than I am. I will, therefore, not take up your time further in speaking of that.

1971. With regard to Sindh, what is the principal cultivation in that part of India; is it a hot weather crop or a cold weather crop?—It is principally a hot weather crop, khurreef.

1972. What are the principal staples?—Jowari and rice.

1973. Is rice very largely grown?—In the delta very largely. Rice will grow on land that is too salt for other crops.

Mr. *Onslow.*

1974. Will you explain what jowari is?—It is a seed crop; the scientific name of it is holcus sorghum.

Chairman.

1975. Is the cultivation of rice carried on by irrigation?—Yes, by artificial irrigation.

1976. Is jowari also grown by irrigation?—Entirely.

1977. Is there a large cold weather crop of wheat and barley, and such like?—There is a cold weather crop of wheat and barley on land which is inundated by the overflow of the river.

Chairman—continued.

1978. Not grown by irrigation?—Not grown by irrigation. In addition to that, there is a comparatively small area actually irrigated.

1979. In the cold weather?—In the cold weather.

1980. You have a small amount of cold weather irrigation?—Yes.

1981. Is that amount very small?—It is very small compared to the hot weather irrigation.

1982. Is that irrigation in cold weather direct from the river, or is it the result of storage?—It is direct from the river. Some of our canals now from the improvements effected in them, run for several months after an inundation. One of them, the Sukkur Canal, runs throughout the rabi season, that is for eight months in the year.

1983. We may say, as a rule, the normal irrigation of Sindh is from inundation canals?—Principally.

1984. Have you any idea what the total area of cultivation in Sindh is?—About a million acres and a half are cultivated by irrigation each year. That million-and-a-half does not include, of course, the fallows.

1985. Does it include the land which is inundated direct from the river?—No, when I speak of a million-and-a-half acres, I speak of canal irrigated land only.

1986. What is the proportion of cultivated land which is not irrigated?—I have not the figures; I should say, perhaps, 500,000 acres.

1987. What rates do you charge for irrigation?—The average on the canals is about two rupees-and-a-half, or 5 *s.* an acre. In some places the rate is as high as 10 *s.* per acre where the irrigation is productive of very favourable results.

1988. The average is two rupees-and-a-half?—Yes.

1989. Is that irrigation rate assessed upon each cultivator, and upon each field separately, or is there any system in Sindh by which the village takes the water?—Formerly the area actually irrigated each year only paid those rates; but within the last 15 years a system of assessment has been introduced under which the people pay a fixed annual sum and cultivate as much of the land assessed as they think proper.

1990. Is that assessment made upon the individual cultivators or upon the village?—I think it is made upon the individual properties.

Mr. *John Cross.*

1991. What is the rate for unirrigated land, that is to say, the 500,000 acres which you spoke of?—There is no assessment for unoccupied land.

1992. What rate does the inundated land pay?—From 1 *s.* to 2 *s.* an acre.

Chairman.

1993. Is not the inundated land very valuable on account of the large amount of silt that is brought upon it by the river?—It is when the land has only been inundated once or twice, but when the water has passed over the country for a succession of seasons the ground gets covered with grasses and is rendered weaker.

1994. Have you ever seen the Upper Valley of

Chairman—continued.

of the Sutlej about Ferozopoor and Ludiana?—I have travelled through that country.

1995. Are you aware that the land in the immediate vicinity of the river there is exceedingly rich, and bears very fine wheat crops and other crops?—I have merely noticed the irrigated crops.

1996. Do you know what is the total land revenue of Sindh?—About 450,000 *l.*

1997. Do you think that the canals bear on to the fields a large amount of fertilising silt?—I do not think they carry a large amount; they undoubtedly do carry a certain amount of the finest silt on to the fields; that coupled with the sweetness of the water of the Indus is very favourable to cultivation. Well-water on the other hand, in Sindh at any rate, is almost everywhere to some extent brackish, and in some places so brackish as to be almost unfit for any purpose whatever.

1998. During your employment as a member of the committee upon the Ganges Canal, did you become aware that the cultivators were in the habit of asserting that their well-water was very much superior to the canal water?—I think I have heard statements to that effect.

1999. I suppose it is the fact, is it not, that the cold weather supply from the Ganges and the Jumna is quite pure water, and has little or no fertilising ingredients in it?—Yes, in the cold weather it is clear.

2000. Are you aware that the Sutlej and the Indus, are much more fertilising and silt bearing rivers than the Jumna and the Ganges?—I think they are more fertilising than the Ganges in the vicinity of the Ganges Canal; I may take Rourkee as a centre, or Meerut.

2001. You have not had an opportunity of comparing the Sutlej with the Jumna, and observing that the Sutlej deposits a great deal of fertilising silt, whereas the Jumna throws up sand?—No, but I compared the silt of the Ganges near the Ganges Canal, with the silt of the Indus, and I found that that in the Ganges was much coarser, and there was more sand in it; the grains of sand were very much larger.

2002. Can you tell me what proportion of the revenue of Sindh is derived from the delta, and what proportion from the valley above the delta?—I should say that not more than one-fourth is derived from the delta.

2003. Is one-fourth of the irrigation of Sindh in the delta?—I should think about a fourth.

2004. Are any of the larger canals which you mentioned to us yesterday in the delta?—Yes; the branches of the Fullaili run into the delta.

2005. Is there any head-work at the head of the delta in Sindh?—None whatever; but the new channel which we formed for the Fullaili has its head, in a strong clay bank, which compared to other parts of the river is permanent.

2006. Is the area of the Indus delta large?—Yes, it is very much larger than the area of cultivation; a great deal of the land is at present salt, and unfit for cultivation.

2007. If there was a sufficient supply of water would that salt be washed out, and the land be rendered fit for cultivation, in your judgment?—Undoubtedly that is what has taken place in former times; the land as it first appears from the sea is of course impregnated with salt, and by constant washing by the river it becomes sweetened and rendered fit for cultivation.

2008. Have there ever been any large projects for the irrigation of the delta; has it ever been proposed to make any sort of dam from the Indus?—It was not proposed to construct a dam, but to lead a canal from a place called Jerrack, where the river bank is quite permanent, to irrigate the delta on the right side of the present main channel of the Indus.

2009. Have you ever had any opportunity of observing an irrigation canal in Egypt and comparing it with the canals in Sindh?—Yes, I visited Egypt some years ago for the purpose of looking at the irrigation canals. The principal thing that struck me there was, that the River Nile was a much easier river to deal with than the Indus. For instance, it runs between what may be called permanent banks; it does not shift from side to side as the Indus does, nor is the quantity of silt in suspension in the water nearly so large, consequently the canals have what may be called their permanent heads with sluices, and the business of clearing them after the season is over is comparatively light.

2010. The quantity of silt in the Indus is larger?—Yes.

2011. Is it of an equally fertilising character?—I should say that the soil of Egypt was more fertile than the soil of Sindh.

2012. Is any cotton grown in Sindh?—Yes; I am not prepared to say how much; but it is irrigated.

2013. Is the quantity considerable?—I think it may be called considerable, but I cannot give the area.

2014. You are aware, no doubt, that in Egypt a very large quantity of cotton of a very superior kind is grown by irrigation on a system not dissimilar to that which prevails in Sindh, the climate being very similar to that of Sindh. Do you know whether any experiments have been made with a view to the cultivation of the same cotton in the same way in Sindh?—Yes, there was an experimental farm established in Sindh, but I cannot speak to the results; I know that several varieties of cotton were tried, and I know that the irrigation of the plant is everywhere understood by the people; it was understood before the experiment to which I refer was tried. They do not allow the water to run all over the ground as they do with an ordinary crop. They cut narrow trenches between the rows of plants, and they fill those trenches cautiously with water, and allow the ground to absorb it, so that it goes to the roots.

2015. Have you yourself formed any opinion as to the reason why Egypt has been so successful as a cotton-growing country, while in Sindh, under circumstances apparently so similar, the growth of cotton has not been so successful?—I think that in Sindh, as a rule, the water supply does not last quite long enough; I also think that the soil of Egypt is lighter, and perhaps better suited to the cotton plant, and moreover, though there is a similarity in the climate of the two countries, still Egypt is more temperate.

2016. Did I rightly understand you to say yesterday, that in your opinion, by a reasonable expenditure, the Sindh canals could be made to irrigate during the cold weather cultivating season on a large scale?—I think they might be improved

Colonel *J. Fife.*

31 May 1878.

Chairman—continued.

improved by constructing some new main canals, so as to furnish a supply of water for eight months in the year in place of four.

2017. In your view, would it be possible to irrigate the delta of the Indus as the delta of the Nile is now irrigated?—Yes, it would be quite possible.

2018. Without an expense of a very heavy character?—Without any very heavy expense.

2019. As regards healthiness, you are aware that at the time of our occupation of Sindh, the country had the reputation of being very unhealthy; do you consider that it is now unhealthy or is it tolerably healthy?—It is not an unhealthy climate, but it is a very trying one to Europeans and also to people from the Deccan, who invariably get ill there. In fact, I think they give in sooner than Europeans.

2020. To the natives of the country you think it is not an unhealthy climate, taken as a whole?—No; it is not unhealthy to the natives.

2021. Do you know what the population of Sindh is?—About two millions.

2022. I understand you to express a quite decided opinion, that though a certain unhealthiness attaches to inundation canals of the character you have described, the canals in Sindh are not all productive of unhealthiness?—No, I do not think so.

2023. To what do you attribute the unhealthiness which attaches to the Ganges Canal?—I should say to the salt efflorescence on the surface of the ground.

2024. I imagine that the atmosphere must be affected by it. I have felt discomfort myself when I have happened to have my tents pitched on salt ground.

Sir *Joseph M'Kenna.*

2025. Do you think that the unhealthiness may arise, firstly, from the decay of rank and luxuriant vegetation?—I should think not; the irrigation crops are very clean as a rule, free from weeds, and when removed the ground is in a condition which any farmer would like to see it.

Chairman.

2026. I understand you to say that the revenue from irrigated land is now about 340,000 *l.*; is that the gross revenue or the revenue after deducting expenses?—That is the gross revenue.

2027. I think you claim that owing to irrigation, the revenue has increased from 240,000 *l.* to 340,000 *l.*, an increase of 100,000 *l.*; now you tell us that those figures represent not net revenue, but gross revenue?—Yes.

2028. On the other hand, you told us that whereas formerly the cost of clearing the canals amounted to only 12,500 *l.*, it now amounts to about 70,000 *l.*; does it not result that when we take the net revenue actually received by the Government, the increase is really no more than 42,500 *l.*?—Yes.

2029. Is not it the case that since 1853, in other parts of the Bombay Presidency as well as in other parts of India, the land revenue has very much increased from natural causes, such as increased value of produce, improved communication, and so on?—Yes; but in Sindh, I think, I am right in saying that the assessment per acre has not been increased.

Chairman—continued.

2030. Has not the value of produce increased from greater facilities for export having been afforded?—The value of produce has very much increased.

2031. Then do you think it can confidently be said that the return upon the capital expended upon these canals is really such as to give a sufficient per-centage to the Government, looking at the matter from a commercial point of view?—Yes, I think that can be said. It is perfectly true that, deducting the present working expenses from the present revenue, the increase since 1853 would appear to be very small; but the greater part of the 70,000 *l.* of the present working expenses is really due to the change which was made from customary labour to paid labour.

2032. Taking you to the Deccan, what are the irrigation rates usually charged in the Deccan?—On the new works we have have generally four rates, 8 rupees per acre for water supplied for 12 months, 4 rupees for water supplied for eight months, and 2 rupees for water supplied for four months; and we have another rate of 1 rupee only, which is applied to crops not usually irrigated, but for which people may require water during a bad season.

2033. Is the taking of water by cultivators entirely optional?—Entirely optional.

2034. About what area is irrigated by the Government works in the Deccan?—The area irrigated by the Government works in the Deccan is 16,000 acres; that is to say, by the new works.

2035. Is there any considerable irrigation from the old Government works?—Excepting Dharwar, the area irrigated from the old works is under 20,000 acres.

2036. Are the works in Dharwar purely Government works, works made and managed by the Government?—In Dharwar they have a number of small tanks similar to those in Mysore and Madras. I think they have about 56,000 acres under irrigation from the old works in Dharwar.

2037. Are those small tanks kept up and managed by Government officers or by the villagers?—The Government repairs them, but it is very common to get the villagers to contribute something towards the expense; and that is a very useful custom, because it prevents the people applying for unreasonable work.

2038. You say that there are only about 16,000 acres under irrigation from the new works in the Deccan, which are very considerable works; can you tell us what the gross revenue derived from that irrigation is?—I have not the exact figures, but the average rate would probably be 5 rupees per acre; so that it would be 80,000 rupees.

Mr. *Fawcett.*

2039. It costs more than 8,000 *l.* a year to keep the works, does not it?—The expense of keeping up the works exceeds a lac; but in addition to the 80,000 rupees, which I have put as the probable amount of revenue, there is a considerable sum derived from the sale of water for domestic purposes.

2040. Besides the 100,000 rupees which it costs to keep up the works, there is the cost of collecting; if you add to the cost of maintenance the cost of collecting, both of which would be current

Mr. *Fawcett*—continued.

rent expenses, you would have a very considerable minus return, would you not?—The sum I mentioned as about a lac, for the cost of maintenance, includes everything.

2041. That includes the cost of collection?—Yes, and a share of the establishment, and repairs, and so on.

Chairman.

2042. Do you think that in the course of years all these great works, with immense embankments, and canals 20 miles long, could be permanently maintained at a cost which, including the expense of collection of revenue, shall not exceed 10,000 *l.* a-year?—I think they could all be maintained at that sum.

2043. Is not it the case that some of the larger irrigation works in Bombay have been considered failures in a financial point of view?—On the land that would be served by the Ekrook tank the people have been very slow to make use of the water, and up to the present time, taking that work alone, it may be regarded as a financial failure.

2044. Do you not think that the result of those expensive irrigation works in the Deccan is very discouraging?—On the whole I think it is not; the Krishna is doing very well; the Rewari Canal, ditto: the Mutha Canal is also doing well; the same remark applies to the Ojhar Canal, and also to the Jamda Canal; they are all improving.

2045. Is not 16,000 acres an extremely small area to be irrigated from so many great works?—Yes, it is a small area, but one of the works, the Mutha, on which a large portion of the capital has been laid out, has only been in partial operation about two years. The water, up to the time at which my figures are taken, had only been carried about 20 miles down the canal, and had not reached the large area of land which it is intended to irrigate; but as far as it has gone the water has been utilised by the people with considerable success. We have imposed a heavy rate for valuable crop, 18 rupees per acre, and this has not deterred people from using the water.

2046. Do not you think those rates might with some advantage be lowered where there is such an indisposition to take the water?—I think that for valuable crops 18 rupees is not too high, because the people sink wells wherever they have a chance of finding a spring and irrigate from them, at a cost of 30 rupees per acre, which is a great deal higher than our water rate.

2047. Are any of these canals fed from small perennial streams?—Several of them; nearly all have a small perennial stream.

2048. Is it your opinion that further works of irrigation in the Deccan might at this moment be carried out with great advantage?—I think they might.

2049. Were you employed in India during the late famine?—No, I was not.

Mr. *Fawcett.*

2050. How much revenue is derived by the Deccan canals from water used for domestic purposes?—I think 50,000 rupees.

Chairman.

2051. Is the ordinary water supply of the people in the Deccan derived from wells?—Yes.

Chairman—continued.

Mr. *Fawcett.*

2052. According to your figures the amount of revenue derived from water supply for domestic purposes is three-fifths of that which is derived from the supply for agricultural purposes?—Yes.

2053. Is that a common thing?—No, it is not; but on one of the works, the Motha Canal and reservoir, a great deal of expense was incurred for the purpose of supplying Poonah city and the Poonah cantonment, and the Kirkee cantonment with water. The work was carried out with a double object.

Chairman.

2054. The Poonah scheme is to a great extent for the purpose of watering the town and the cantonment of Poonah?—Yes.

2055. With regard to wells, you explained to us that the wells are very precarious and uncertain in the Deccan, and you said that it would be a great advantage that canal water should be brought in?—Yes.

Sir *Joseph M'Kenna.*

2056. Is there any accessible stratum at which water is permanently found in the Deccan?—I do not know of any.

2057. I understood from Sir George Campbell that it is very uncertain at what depth you may find water in the Deccan, but is that irrespective of the relative altitude of the plain?—No, I think it arises from the formation; the formation is trap, and it is only where there happens to be a fault that a spring is found. In some places the wells are carried to an enormous depth and no water is found; and in others where water is found it very often fails during the hot season.

2058. Then the dry weather bearing stratum must be very deep?—No doubt.

2059. What is the area along the banks of the Indus that the irrigation works would be capable of irrigating?—About 23,000 square miles.

2060. What would be the breadth of that area along the entire stream?—An average of 70 miles; that is 35 miles on each side.

2061. Do you suppose that the irrigation of so large an area as that would cause any unhealthiness in the area so irrigated?—I have no reason to think that it would do so. In some places we have already a large area of country thoroughly irrigated and no sickness has been remarked in that district. A great deal of the 23,000 square miles is unoccupied; the irrigation is not spread uniformly over the country.

2062. But would there be any engineering difficulty in spreading it all over the country, supposing the population needed it?—None at all.

2063. Do not you think the population would rapidly increase if the means of production were increased in that way?—I believe it would increase, but I am not sure that it would increase very rapidly. Sindh has a rocky and almost uninhabited country on the west and north, and it has the great eastern desert on the east.

2064. It is not unlike Egypt?—No; consequently the people who immigrate must come from a long distance.

2065. You mentioned that one of the expenses of irrigation was the continual silting up of the

Colonel *J. Fife.*

31 May 1878.

Sir *Joseph M'Kenna*—continued.

small canals every year; is that the case in Egypt?—Comparatively speaking, to a very small extent.

2066. Is the water more heavily laden with silt than the water of the Nile?—Yes.

2067. Are you of opinion that it would be a wise thing on the part of the Government to carry on extensive operations, with the view of bringing a large portion of this land into cultivation?—I think it would.

2068. Would the expense be very considerable; I mean the expense per square mile?—No; I think the expense would not be heavy. I think the works in Sindh could probably be constructed at a cost not exceeding 15 rupees per acre.

2069. You stated that the rate charged upon some land was as high as 18 rupees per acre per annum?—That was in the Deccan. In Sindh the highest rate is about 5 rupees per acre for the best kind of irrigation.

2070. That would give a profit of 30 per cent. per annum?—Yes, if there were no working expenses.

2071. Would the working expenses be so serious as very materially to reduce that?—The working expenses are very heavy in Sindh, owing to the silt clearances.

2072. You spoke of the Desert Canal; is that a canal intended to irrigate some of the desert?—The Desert Canal is a work which was proposed by the late General Jacob, who had command of the frontier force in Sindh. It is to irrigate a tract of land which lies between the Bigari Canal and the foot of the Beloochistan Hills.

2073. Is that in Sindh?—Yes.

2074. Does that afford any test by which you can judge of the practicability and expense of irrigating this large desert country which you have described?—Yes, to a certain extent; but the works which would be required to irrigate land less favourably circumstanced than that under the Desert Canal, would probably cost more. The Desert Canal may be looked upon as a cheap work.

2075. Could you give us any general idea of the annual amount which you would think it desirable to spend upon irrigation works, with a view to bringing this land into cultivation?—I think 250,000 *l.* per annum could be advantageously laid out by the Government without disturbing the labour market. The population in Sindh is very sparse, and consequently if too much were attempted harm might be done; but I think that 250,000 *l.* would not be too much.

2076. Would that bring into cultivation an area of something like 180,000 acres every year?—Yes, it would.

2077 Do you think that the English population would be sufficient to cultivate that additional quantity of land every year?—I think fully sufficient if irrigation were facilitated by improving the water level. At present a considerable area of the Sindh irrigation is carried on by Persian wheels, but if the water level were improved, that is to say, raised, so that the trouble and labour of raising the water could be dispensed with, all the labour so employed would become available for the cultivation of new land.

Chairman.

2078. Is a large proportion of the water from these inundating canals raised by Persian wheels?—I should say about one-half.

Mr. *Hardcastle.*

2079. I understood you to say that the irrigation was carried on by means of simple cuts in the bank of the canal, and that there were no sluices or anything of that sort?—We have sluices on the branch canals, but there are no sluices at the mouths of the main canals, except in some instances, which I think I mentioned the other day, that is to say, except in the case of the Sukkur Canal, the Eastern Nara Canal, and the Bigari Canal.

2080. Do you think that any other part of India offers as great a probability of return from irrigation works as the banks of the Indus?—I should think that the lower parts of the Punjaub, which is very like Sindh, could be irrigated with equal success.

2081. But the country along the banks of the Indus is more especially fitted for irrigation than other parts of India, generally speaking, is it not?—Undoubtedly, irrigation is absolutely necessary, and consequently there is no delay on the part of the people in making use of the water. And there are other advantages flowing from irrigation in that part of the country. When the land is allowed to lie fallow it has a complete fallow; I mean to say there are no weeds growing on it, and there is very seldom, except when there is a bad inundation, anything to destroy. The crop has very seldom any blight.

2082. What is the amount now allowed by the Government for irrigation works?—The amount allotted when I left India was about 200,000 *l.*, but that had to cover all repairs as well as new works.

2083. About how much of that would be available for irrigating new land on the banks of the Indus?—About one-half; one-half not only for Sindh but the Deccan, for new works; it would have to be divided between the two.

2084. You stated that you thought that 250,000 *l.* a-year might be expended with advantage in irrigating new land along the banks of the Indus; what I want to get at is this; about how much is available now under recent grants of the Government for that purpose?—About 50,000 *l.*

2085. About a fifth of what you think might be advantageously expended?—Yes.

Mr. *John Cross.*

2086. With regard to what you said about properly designed works for the Deccan, you estimated that the return in the first 15 years would not be more than 2½ per cent.; that after that it might be nearly 5 per cent., and afterwards 10 per cent.?—Yes.

2087. You did not give us any instance in support of that estimate?—I based my calculation as to the ultimate return which would be derived from the works on what I had seen of the irrigation carried on in the part of the Deccan called Kandeesh. We have constructed works very similar in character, but on a larger scale than those in Kandeesh, and taking their costs and capabilities, and applying the water rates now

Mr. *John Cross*—continued.

now current in Kandeesh to the new works, I arrive at the result mentioned, that 10 per cent. may be ultimately expected.

2088. Could you give us the figures showing the cost and the results in Kandeesh?—I cannot at present. The Krishna Canal might be taken as an example of a work in which the return will ultimately rise to 10 per cent. It is an entirely new work. The irrigation from that work commenced about 11 years ago, at which time the water was passed for a distance of three or four miles of canal only. Subsequently as the works progressed, the water was passed further, and the extent of irrigation and the amount of revenue have grown steadily ever since. The last figures I saw showed an area of over 1,000 acres of sugar cane on that canal. Now the water rate for sugar cane on the old works in Kandeesh, is as much as 36 rupees per acre, and I should explain that in Kandeesh they have a consolidated rate of 18 rupees per acre on some of the works where there is a triennial rotation. Of that, 16 rupees was considered by the revenue officers due to water. One of the most experienced settlement officers, Mr. Pedder, of the Civil Service, made a calculation which he gave to me, showing that if the rate of 16 rupees was distributed over the three crops forming the triennial rotation, in proportion to their value or the water used, it would give 36 rupees for sugar cane, 8 rupees for rice, and 4 rupees for wheat; that is, supposing you take the three years' crops, the cultivators would pay three times 16, that is 48 rupees for the three crops, and that divided in fair proportions between sugar cane and rice and wheat, would give 36 rupees for sugar cane, 8 rupees for rice, and 4 rupees for wheat.

Chairman.

2089. Is there any large area in which they really pay such heavy rates?—The whole of the irrigation area in Kandeesh, is about 15,000 acres. The area of the triennial rotation is comparatively small; we have other cases in which the rotation is quadrennial.

2090. Independent of rotations, what is the average rate charged for irrigation in Kandeesh; that is to say, on the 15,000 acres?—The 15,000 acres yield two lakhs of rupees.

Mr. *John Cross.*

2091. Returning to the subject of the Krishna Canal, that canal has 1,000 acres of sugar cane which are at present assessed at 10 rupees per acre for water alone; if that rate were increased from 10 to 36 rupees, which it may be eventually, there would at once be a revenue of 36,000 rupees per annum for sugar cane?—Yes.

Chairman.

2092. Is there any sugar cane in Sindh?—A small quantity; comparatively a small quantity. It has to be grown by water drawn from wells. It is a crop which must be in the ground for at least eight months.

Mr. *John Cross.*

2093. It is on those estimated receipts that you base your opinion that works properly designed in the Deccan would yield this revenue?—Yes.

2094. Not on any actual receipts which have been got from any considerable area?—Not actual receipts on the new works up to the present time.

2095. It is entirely an estimate?—Yes, but I am satisfied myself that if the rate for sugar cane were increased to the extent that I have mentioned, it would not stop the cultivation, and the Government would obtain 36,000 rupees per annum from that one crop alone. The cost of that Krishna Canal was about 70,000 *l.*, and its annual expenses may be taken at about 1,000 *l.*

2096. You really base your estimate upon what the works in the Deccan would produce, on what the works in Kandeesh ought to produce?—No, on what the works in Kandeesh do produce.

Chairman.

2097. Those are old works?—Yes.

Mr. *Fawcett.*

2098. Old native works?—Old native works.

Mr. *John Cross.*

2099. In the estimate of the cost of the works in Kandeesh, very little has been reckoned for the value for the old native works, I suppose?—I have not taken the actual cost of those works into consideration; I merely gave the Krishna as an instance of work similar to the old native works, but on a larger scale, and I have given the cost and what the revenue from the sugar cane crop alone would be, supposing we applied the current Kandeesh water rate to the Krishna Canal.

2100. In the Deccan is there much land suitable to the cultivation of sugar?—A great deal; it is a very popular crop; whenever the natives are not at the mercy of money lenders they take to sugar cane.

2101. You have told us nothing whatever about any opinion you may have as to the advantage or disadvantage of water navigation as compared with railway transit; have you formed any opinion upon that point?—The only inland navigation which we have in Western India is that on the Indus, where the cost of transit is about three farthings a ton per mile up and down. The canals are some of them large enough to be navigable, and are to some extent navigated, but the supply of water does not last long enough to make the navigation very valuable, and moreover the lines of canal generally do not follow the lines of traffic; the traffic is generally across them.

Chairman.

2102. Can you tell us the rates per mile which are actually charged by the steamers plying upon the Indus for goods?—I think about one penny per ton per mile.

2103. That is to say, per mile of river traversed?—Yes.

2104. Taking into consideration the windings of the river, how would that rate compare with the charge by the railway?—The windings increase the distance by about one-fourth; I have no doubt canals are practicable, as far as construction is concerned; the question of their return is simply one of traffic.

2105. In your opinion, when the railway from Kurrachee is opened, will the railway beat the river in the competition for the traffic, or will the river beat the railway?—I cannot say which will

Colonel *J. Fife.*

31 May 1878.

Chairman—continued.

carry the most traffic, but I am quite sure, from what I have seen of the river, that the railway will not extinguish the navigation traffic.

2106. Is there a very large boat traffic upon the Indus at this moment?—Very large ; it has been growing enormously ; I have no doubt that when there is competition the rate per ton per mile by boat will be reduced considerably.

Mr. *John Cross.*

2107. You compared the delta of the Indus with the delta of the Nile, and you said that the one was as capable of cultivation by irrigation as the other?—Yes.

2108. Do you know what the difference of temperature is between the two places ; does not the temperature in the valley of the Indus very greatly exceed the temperature in the valley of the Nile?—Very greatly ; I should say by about 20 degrees.

2109. Are you aware whether that high temperature in the valley of the Indus, as compared with that in the valley of the Nile, has a detrimental effect upon the growth of cotton?—That I cannot give you any information on.

2110. Are you aware that the staple of cotton grown in Sindh is very inferior?—Yes, I am aware of that ; I attribute that to the extreme dryness of the climate, and the great heat ; the climate of Egypt, though dry, is not so dry as that of Sindh.

Chairman.

2111. Do you speak of Egypt in general, or only of Lower Egypt?—Lower Egypt is the only part I have seen.

Mr. *Onslow.*

2112. Can you tell me what is the total mileage of canals in Sindh?—I should say about 3,000 miles ; that is including what you may call the principal branch canals which are managed by the Government.

2113. Has there ever been any severe famine in Sindh in your time, or before your time?—No, I never heard of a famine in Sindh.

2114. Has there been any great scarcity in your time in that country?—There was considerable distress about four years ago, in consequence of a severe flood. I think about 50 years before that there was still greater distress caused by a severe flood, followed by a bad inundation, and at that time communication being comparatively very imperfect, the sufferings of the people were very much greater than they would otherwise have been.

2115 Are you of opinion that the canals which exist in Sindh at the present time have ever been the means of averting a great scarcity?—Yes, I should say they had.

2116. Do you think that now, with the Indus Valley Railway, in addition to the river Indus, Sindh will be effectually provided for in case of scarcity?—I think so.

2117. As far as Sindh goes, you think much more money need not be spent in the way of irrigation?—I think there is a large field for irrigation there, and that the present population would benefit very much by improved irrigation, and that a larger revenue might be produced.

2118. I am speaking of the prevention of famine ; as regards the prevention of famine, do you think that anything more is needed in the way of means of communication?—No, I do not think anything is needed.

Mr. *Onslow*—continued.

2119. But, as far as the development of the capabilities of the soil goes, you think that there is room for more irrigation?—Yes.

2120. You were talking of the old channels which were found when we annexed Sindh ; can you say how those native channels were made?—In some instances there was evidence of their having been originally natural channels, and afterwards improved by labour.

2121. What do you mean by improved?—They were excavated.

2122. Were they bricked up in any way?—No, merely excavated, and, perhaps, straightened in some places.

2123. Many of those channels are now choked up, you say?—The upper part of the Fullali Canal, the upper part of the Gar, and the channel called Pinyari, and also the Eastern Nara. Those are four natural channels which have been converted into canals.

2123*. Do you think that at the present time the canals in Sindh are deteriorating, because enough money is not spent upon them?—No, I do not.

2124. You would not agree with this remark in the Blue Book, which has been laid before us referring to the Sindh canals: "The canals are deteriorating solely owing to the sum annually allotted being less than is adequate for the purpose"?—I do not agree with that. I may mention that I wrote a memorandum for the information of the Government of Bombay, on the subject of the remarks in that Blue Book, which I believe was sent home, pointing out that there was some misconception as to the state of the works in Sindh, and that they could not possibly be in the state described there, since it was known that the area of irrigation had largely increased.

Chairman.

2125. Do you think that those statements contained in that Blue Book were not founded on any official communication?—I imagine that they were not founded on any official communication.

Mr. *Fawcett.*

2126. Perhaps you will be good enough to put in your memorandum?—I will furnish it to the Committee.

Mr. *Onslow.*

2127. You said that there had been an increase of population in Sindh owing to immigration ; at the same time you say the soil naturally is very poor ; are we to understand from that that the immigration has been caused by these canals being made?—Yes, and also by the better government. On the frontier of Upper Sindh there was formerly no security for life or property. The tribes from the hills made raids, and carried off cattle and anything they could lay their hands on ; that was all put an end to by General Jacob, and a large number of people who formerly lived by plunder were induced to come into Sindh and settle upon the irrigated land.

2128. Is it your experience that in districts under British rule, where the land has been irrigated, there is usually a large amount of immigration?—That is the case in Sindh.

2129. Is it the case generally?—In the Deccan and in Khandeish I have observed no change, but

Mr. *Onslow*—continued.

but in Sindh undoubtedly the people follow the water.

2130. But not in the Deccan or in Khandeish?—No. The irrigation in the Deccan is carried on by the villagers, who are, you may say, permanently on the spot, who have permanent villages; in Sindh, on the other hand, the people move about a good deal.

2131. You gave us an estimate of the construction of the canals under native rule, which you put at 2,000,000 *l.*?—Yes.

2132. That is according to the present price of labour?—I made that calculation a few years ago; I may say that the cost, according to present prices, might exceed 2,000,000 *l.*

2133. That 2,000,000 *l.* is somewhat fallacious, because 20 years ago, when the price of labour was less, that 2,000,000 *l.* would be materially diminished, and 10 years hence the 2,000,000 *l.* would probably be a great deal more?—Just so; I made that calculation when I was resident in Sindh, about 10 years ago.

2134. Since that, the price of labour has gone up very much?—Since that the price of labour has gone up very considerably.

2135. Ten years before you made that calculation, the price of labour was not so high?—I should say the price of labour was as much lower.

2136. You spoke of the desert on the east side of Sindh running into Rajpootana; if it was possible to irrigate that land, would it, in your opinion, be productive?—No, it is too sandy; the country is almost pure sand; and moreover, it is not a flat plain like Sindh; it consists of huge sand hills, some of them 150 feet in height, and a mile in length.

2137. In your opinion, it would be a waste of money to endeavour to improve that land?—I think so.

2138. Irrigation in Sindh is dependent more or less upon the amount of snow which falls on the Himalayas, is it not?—Yes.

2139. The Indus water is snow water from the Himalaya range?—It is.

2140. And therefore that river is very differently circumstanced from the rivers in the Deccan, the rivers in the Deccan being only supplied by the monsoon?—Precisely; they are supplied by the south-west monsoon; at the same time, as Sir George Campbell explained in his evidence the other day, that south-west monsoon never fails where it strikes the Ghauts near the sources of those rivers; it does fail inland, but it never fails in the upper part of the catchment basin of the Deccan rivers.

2141. The Indus water is supplied from two sources, namely, from the snow of the Himalayas and from the ordinary rainfall, and therefore there is less likelihood of the canals fed by the Indus becoming denuded of water than those in the Deccan where there is only one source of supply?—Undoubtedly, the Indus has a more regular supply than any rivers in the Deccan.

Mr. *Onslow*—continued.

2142. Is there any food exported from Sindh, or is there only sufficient grown for the population?—The exports are very large; the land is extremely productive under irrigation.

2143. Does the exportation of food increase every year?—As far as my knowledge goes, it is increasing very largely.

2144. Could you tell us roughly, how much it has increased during the last 10 years?—I can show it for seven years. The value in 1869-70 was 129,092 *l.*, and in 1876-77 it was 204,445 *l.* About half the grain comes from the Punjab.

2145. Is not it the fact that there has been a great waste of money owing to the different projects having been sent up to the Supreme Government; if the local government had had to raise the money themselves, would they have been so profuse in their expenditure as they have been in the construction of these works?—I think if the responsibility was entirely thrown upon the local governments they would study economy much more closely than they now do.

2146. By "responsibility," you mean the responsibility of raising the money for the works?—Raising the money for the works and paying its annual interest.

2147. You think there has been a waste of money in these local governments, expecting all the money which they required for these canals to come from the Imperial Government?—I think there has.

Mr. *Fawcett.*

2148. You spoke of particular parts of India being burthened by the works establishment being too large?—I said that that was the case when the progress of the irrigation works was checked, about seven years ago.

2149. But is not that evil very much likely to be aggravated by the system which is now adopted of sending out regularly a number of young engineers from Cooper's Hill, instead of adopting the plan they used to adopt of indenting as it were for engineers when they wanted them?—Undoubtedly, if a number of engineers are sent out regularly from Cooper's Hill every year, it necessitates the keeping up of the permanent establishment to a certain figure.

2150. So that that evil which you referred to of having a large and expensive Public Works Department, may rather be intensified by the system to which I have referred?—If the supply is entirely from the college, I think it may.

Thursday, 6th June 1878.

MEMBERS PRESENT:

Mr. Ashbury.	Lord George Hamilton.
Mr. Balfour.	Mr. Hardcastle.
Sir George Campbell.	Mr. Sampson Lloyd.
Mr. John Cross.	Mr. Mulholland.
Mr. Fawcett.	Mr. Ernest Noel.

LORD GEORGE HAMILTON, IN THE CHAIR.

Sir GEORGE CAMPBELL, K.C.S.I. (a Member of the Committee); further Examined.

Sir *G. Campbell*, M. P., K.C.S.I.

6 June 1878.

Chairman.

2151. I BELIEVE you are anxious to amplify the last answer which you gave in reply to Question 1869?—I wish to say that I entirely adhere to the view which I took in the answer which I gave to that question, that is to say, that it is quite possible that, as India receives improvements due to modern appliances, it may be right and proper that the country should be taxed for those improvements which have been received. And I would even go so far as to say this, that my impression is that great public works, beyond the ordinary current necessary works which have always been provided for from current revenue, cannot be made without fresh taxation or increase of income from some source. My opinion is grounded upon this, that it seems to me that the revenue is now cut so close, if I may so express it, especially since the abolition of the income tax, that, until at least the taxation imposed this year, it was quite impossible that that revenue should bear any fresh burdens such as would be imposed upon it by large public works made without providing an additional income. It seems to me that the principle which I seek to enunciate was established in the imposition of the road cess in Bengal; that road cess was a cess imposed in addition to and apart from the ordinary land revenue, in order to make roads which had not hitherto been made, and which the ordinary resources of the country were not sufficient to make, and which also had not been contemplated when the land revenue and the ordinary taxes were imposed. That imposition of an additional cess for the purpose of public works in the shape of local roads has been, I think I may venture to say, a complete success, inasmuch as the money has been paid, not only without resistance, but almost without grumbling; and the people finding that it is a cess imposed by themselves for their own benefit, and that it is administered by themselves, and that it does really benefit themselves, are quite content to pay the cess, and they have paid it so readily that my successors in the Government, with the full sanction of the Government of India, have extended the system which I introduced in certain districts, into the whole of the districts under the Government of Bengal.

2152. Was there much opposition on the part of the zemindars to this road cess?—At the time when the cess was first proposed when the question was debated in the Bengal Legislative Council, it was very much opposed; there was very great opposition, not only on the part of the zemindars, but also on the part of the old Indian officials, and especially the officials connected with Bengal. I myself know that some very experienced men, and even some men of the very greatest experience and ability in the Indian Council at Home, declared that it was totally impossible to levy this tax, that it would create rebellion, and all kinds of dreadful things would happen. That was the case while the question of the imposition or non-imposition of the tax was being debated, but since the tax has been imposed I may say that all opposition has ceased, and that both the zemindars and ryots, who are the parties principally affected, have accepted it, and that there is practically no opposition to the tax; indeed there has been no opposition to its extension to districts to which it was not applied in the first instance.

Chairman—continued.

2153. Then this opposition to the road cess emanated from a special, but at the same time an influential, body of persons?—That was so.

2154. And the great mass of the people in Bengal, so far as you know, were not averse to its imposition, and have since very patiently contributed towards this cess?—I could not venture to say that the great mass were not adverse to the imposition, because I think we must feel in this case as in most cases, that the dumb millions know very little about what is going on until the thing is imposed, and therefore whilst they did not demonstratively oppose it, I cannot say that if the question were put to them, they would not in the first instance have been adverse to it. All I can say is, that since it has actually been imposed, since those millions, and there are many millions, have actually paid that tax, there has been no opposition on their part. It so happened that the tax was accompanied by a necessary system of registration of tenures, which was very agreeable to the ryots, inasmuch as they thought it gave them a security which they had not had before, and there were those incidental reasons why tax paying, which is not usually at all grateful, seems to have been actually grateful to the people

Chairman—continued.

people of Bengal when it was put into actual practice.

2155. I think you were illustrating by alluding to the road cess, the method in which you would propose to raise taxation, or how increased taxation might be justifiable?—That is so; the road cess, is a case in which taxation is raised directly for the purpose of its immediate application, the construction of public works, the means of constructing those works being raised from year to year as the money is required. But the question before the Committee being more especially as regards the borrowing of money for public works, I also wish to say that in any case in which it is thought desirable to borrow money for public works, I think that we must provide by new means for the interest upon the money so borrowed, and for a sinking fund by which it may be eventually worked off. We must do so either by imposing rates and taxes, or by assuring ourselves that the work itself shall be remunerative, and shall itself return an income which will suffice for those purposes. But with regard to those remunerative or self-supporting public works, I would also like to say this, that it appears to me that the works most likely to pay, that is to say, the principal railways running through the most populous districts, and the irrigation canals, where nature is most favourable to the system of irrigation, those works which are most likely to pay having been already taken up, I think there must exist very great doubt as to whether fresh works which may be taken up really will pay. My view is that with regard to works of that kind also you must, before undertaking them, make a provision for meeting any deficit which may occur. You must, I think, either do so by a system of local rates, by which the cost of particular works may be met, or by establishing, through general taxation, such a margin of revenue that you may have the means from thence of meeting any deficiency which may occur in those works which their promoters have put forward as likely to be remunerative. Then, in order to check extravagance in this respect, I am very much in favour of a system of enforcing local responsibility; and in order to explain somewhat more fully my views on that subject, perhaps the Committee will allow me to amplify a little the answers which I gave to Questions 1833, 1834, and a few following questions upon that subject of local responsibility. My own opinion is that it would not be desirable to allow either the local governments or any other local bodies to go directly into the market in order to raise loans; I think it would be very much better that they should under the present system take any loans which they desire to raise from the Government of India; I think it somewhat dangerous to allow local governments and other local bodies to raise loans in the market both in this country and in India. Especially as regards India, I am very much inclined to the opinion that any advantages which may attach to a system of that kind are more than compensated by that complete supervision and check which is exercised by a superior power which has in its hands the disbursing of the money. As regards the mode of raising loans, I am myself very strongly of opinion that the opportunity of lending money to the Government in small sums should be distributed locally as far and as wide as possible; but I think that the authority for all the loans should be the Government of India, acting under the authority of Parliament and the Secretary of State in this country, and that local bodies should not be allowed to raise loans in the market of India.

Chairman—continued.

Sir *G. Campbell*, M.P., K.C.S.I.

6 June 1878.

2156. You are, of course, very intimately acquainted with the relations between the local subordinate governments and the Supreme Government of India; would you state to the Committee what would be the process which you would wish that the local authorities who want to carry out some great work should adopt, in order to get money from the Supreme Government, and I assume at the same time, to give some reasonable security for the payment of the interest?—I would have the thing done exactly as it is now done under the Indian Public Works Loan Act, with this difference, that, as I have suggested to the Committee, I am inclined to think that in the public accounts loans of that kind are not sufficiently distinguished; I think that they ought to be made clear in the public accounts; and there is this additional difficulty which I have already suggested, namely, that although the localities have certain securities of rates and taxes to offer, it seems to me that the local governments who may wish to borrow money for provincial works have, in fact, as matters are at present arranged, no security whatever to offer; perhaps I might explain a little more fully how that is. The only revenue which the local governments now possess, apart from local rates and taxes which are applied to local purposes, and administered by local bodies, the only revenues applicable to provincial purposes possessed by the local governments, are the annual sums which are assigned to them by the Government of India, which sums are assigned to them for specific purposes in order to carry on certain public services, including the ordinary current works and repairs, which are a necessary part of our system in India. It seems to me, that to allow the local governments to borrow on the security of that revenue so assigned to them, would be altogether a false and vicious proceeding. I might compare it to the case of a man who has put his wife upon an allowance; he would altogether object to allow his wife to borrow upon the security of that allowance, because it would take away the means by which she is to be supported in future. On the other hand, although it is expected, and is the fact, that certain economies have been introduced by the local governments on account of the direct interest which is given them by this system of local assignments, it must be remembered that those assignments are fixed assignments, which have been made to meet certain charges, which charges are of a growing nature. The expense of gaols and of police, the current expense of public works, and the expenses of other departments which have been made over with an allowance to the local governments, are expenses which have been growing from year to year, and which must necessarily grow; therefore I believe that any economies which might be effected by the local governments must be absorbed by the growing nature of those charges, and that in fact there is no margin to spare from those allowances which can be offered as a security for any public works, beyond the ordinary annual current works.

2157. As regard the local bodies, what powers of taxation, or of levying cess, have those local bodies; are they limited by the Acts of the Go-

Sir *G. Campbell*, M.P., K.C.S.I.

6 June 1878.

Chairman—continued.

vernment of India?—They generally levy rates and taxes under the Acts of the local legislatures. The Committee are aware that there are local legislatures in Bengal, Madras, and Bombay, and in those provinces the rates and taxes are generally levied under the Acts of those legislature which also require the sanction of the Viceroy individually. In the other provinces, which have no local legislatures, those rates and cesses are levied under the authority of Acts of the Government of India.

2158. But the local governments, if they have the power of taxing, surely could utilise those powers themselves?—Yes. I was just about to come to that view of the case. It certainly was part of the original plan of decentralisation which was instituted by Lord Mayo, that inasmuch as certain limited revenues were made over for certain limited purposes, if the local governments and local bodies wished to extend those purposes, and wished to possess themselves of additional improvements and additional advantages, for which provision was not otherwise made, they should exercise a power of taxation, or of rating, which was given to them by that original scheme of decentralisation. It was upon that principle that the road cess in Bengal, and one or two other cesses in other provinces, were imposed under those powers so given. But shortly after that system came into operation, and soon after the road cess had been sanctioned, a new Viceroy, Lord Northbrook, came to India, whose opinions were extremely adverse to any increase of taxation in any shape. I think I may say that one or two plans of provincial taxation which had been proposed in Madras and Bombay, were not plans which commended themselves very much to my judgment, or to the judgment of a good many other people; but at any rate, be that as it may, Lord Northbrook, being extremely opposed to any increase of taxation, put an entire stop to the exercise of powers of that kind for the time, and publicly declared that he would not allow any increase of taxation. The consequence is, that at the present moment there is no provincial taxation of any kind imposed by the authority of the provincial legislatures. There are only a few rates for local purposes which have been so imposed, and which are solely devoted to local purposes. I think I may say that the only exception to that statement is a rate which has been lately imposed in Bengal, and the North Western Provinces, not for local purposes, but to make up for the past losses incurred by the great works which were made by the Government of India in the Public Works Department, to which I have already alluded. My view is, that if you are to have improvements in the shape of expensive public works, and such like, it is impossible to adhere very closely to the doctrine laid down by Lord Northbrook, that there must be no more taxation; but, on the contrary, my view is, that if the provincial administrations wish to have more works, they must raise locally the means of paying for those works. That a principle which it would not be difficult to lay down and to adhere to in the case of works which are not expected to be remunerative and self-supporting; but then, undoubtedly, a difficulty does arise with regard to works which are expected to be remunerative, because you find that the promoters of works, and people who are anxious to have those works (and the provincial governments are sometimes no exception to the rule), are very apt to say, in a sanguine manner, that a thing will pay, although when the work has been made it may turn out that it will not pay; and, therefore, when local governments apply for expensive works, not proposing to provide for them by taxation, but stating that they are likely to be self-supporting, I think that you must insist that these local governments should themselves provide beforehand the means of meeting any deficiency which may possibly arise, that there should be some scheme of rating, or other system of taxation by which that deficiency may be supplied in case it actually occurs. I should like to illustrate that by a case to which I have several times referred, namely, that of the Madras harbour. The Madras harbour is exactly a case of that kind. The Government of Madras, and I believe the Madras officials, and other people connected with Madras generally, were very anxious indeed to get that harbour. They said that large sums of money had been expended in other parts of India, and they wanted that from the general funds of India money should be expended in order to give them this Madras harbour, which they said they very much wanted; and they went on to say, "Oh! it is certain to pay; we have got an estimate by which it is shown that it can be made for a very moderate amount, and by putting certain dues on ships, and so on, the interest upon that amount will be paid, and there will be no loss to the Government of India." And, further, it was stated that there was some kind of understanding that if it did not pay, the Government of Madras would, somehow or other, manage to make it pay, or to raise the funds. Being in the Council of India at that time, as I think I have already stated, I took some objection to that view of the case, and what I said was this: If these Madras people really are so confident that they can make the thing pay, let them provide beforehand, by means of their own legislature, the means of insuring us against loss; let them provide that the interest, and any necessary sinking fund upon this Madras harbour, shall be raised, either by a rate upon the Madras shipping, or by a rate upon the Madras port, or upon the Madras town, or upon the Madras province, or in any way that they may think right; but let us have it in black and white, that whether the harbour succeeds or whether it fails, those people who insist upon making the harbour should themselves provide a means by which the interest of the money may be met, and we may be guaranteed against loss. The only answer to that argument, I think, was, "Oh, it is understood that something of the kind will be done," but nearly four years must have passed (it is more than three years since I left the Council), and I know that the harbour works have been going on, but that no such Act as I suggested has yet been passed by the Madras Council; on the contrary, I find that those very Madras people, who at the time were so anxious to get this Madras harbour, have now begun to pick holes in it, and declare that it is likely to be an engineering failure, and a failure in other ways, and I have the very gravest doubt whether an Act guaranteeing this money, ever will be passed by the Madras Council, or if it be passed I am afraid it will be passed only by the authority of the Government Members in a way which will not carry any

Chairman—continued.

any moral weight for it. Therefore it is, I think, that in all such cases before money is lent you should have some authority of the local legislature, or other local authorities, by which the burden should be distinctly and irrevocably imposed upon the locality.

2159. I do not know whether you recollect the despatch which went out sanctioning the Madras harbour; but my impression is that in the last paragraph your suggestion was acted on, and that it was only sanctioned on condition that the Madras Government passed a local Act by which they should by some means or other raise the funds necassary to repay the interest on the sums which were borrowed?—I think that was so, but my suggestion is this, that notwithstanding that order the thing has not been done. The Madras people have waited to see whether the thing is a success or a failure, and now that they begin to think that it will be a failure I am afraid they are not likely to pass the Act.

2160. And further, the sums which have been granted to the Madras Government have been put under the head of "Advances Repayable," so that there is a certain chance of the Supreme Government never getting repaid the money which they advanced to Madras for the prosecution of what is a local work?—That is what I am afraid of, because, as I have said before, I think the local government has no security upon which you can come, and that, if they fail to pass an Act to raise the money by rates or taxes, the Supreme Government will have no means of getting their money back in case there is a loss. I should like to say, in connection with that subject, that my view is, that those local legislative councils are really very good and very useful bodies, and are very fair exponents of local interests; and for that purpose they might very well be held to bind the provinces which they represent. As regards the interests of the different classes, I am not at all sure that they are fairly represented in those local councils, but when it becomes a question between local interests and the general interests of India or of the Empire, I believe that those local councils are very fair exponents of the local interests; and in that respect, they differ very much from the Legislative Council of the Governor General, which is wanting in independence, and for some purposes very much of a sham. Those local councils also are nominated councils; but the members are nominated for some period of time, and they have generally shown very considerable independence; the independent members have taken a very active share in the business, and they are very useful members. In my opinion, it would be most desirable that there should be local legislative councils of that kind in every local government and administration in India; at present, they have no such councils in the North West Provinces, or in the Punjab, or in the various chief commissionerships. Under due safeguards I am in favour of borrowing for useful local purposes, provided the system is not carried to excess; but my view being that money should not be lent for such purposes, except to some local authority which should be fairly binding upon the provinces and localities, I think that you should have a local authority of that kind in every government and every administration. Then again, going to smaller

Chairman—continued.

areas, I think that in every district you should have some kind of local authority for the purpose of dealing with local works and local improvement; for instance, in Bengal, we have in every district a local body partly nominated, and with some infusion of the elective principle, known as the road cess committee. I think that that might be expanded with very great advantage into a sort of general improvement committee. Going again into smaller areas still, I should be very much inclined with this object of public works and public improvement especially in view, to cherish and improve the tone of the town municipalities which have been very commonly established throughout India, and especially, I should like to do that to which I have before referred, namely, to re-habilitate and put into working order the village institutions which have fallen into desuetude and disrepair in many parts of India, and especially in Bengal. My general view upon this subject then would be that in future public works are to be constructed, they should be constructed by the local authorities, and upon the security of those local authorities, by provinces, by districts, or by towns and villages; but that all applications for loans of that kind should be very minutely examined and checked by the higher authority, and that there should in every instance be a provision for a tolerably rapid sinking fund. In short, I may say, that I should like the system to be very much that which prevails in this country under the Public Works Loan Act, with this difference, that I think in India there should be a more exact and a more complete and special supervision by the superior authorities, and that you should not so completely trust to the self-administrative power of the local authorities as you do in this country, but that in such case the higher authorities should supervise and test the proposals minutely before a loan is granted.

2161. Have you any suggestion to make as to the manner in which the loans should be raised for the prosecution of public works?—I think that on the last occasion on which I gave evidence before the Committee I expressed my general view on the subject, to the effect, that even if loans cannot be raised on quite so advantageous terms as in England, still the political advantages of raising them in India are such that I should prefer to raise them in India; and also, that in raising them in India, both upon political grounds and upon financial grounds, it would be extremely desirable to raise the money in small sums, and to give great facilities for the smaller people throughout the length and breadth of the country to lend their money to the Government; I referred on that occasion to the system of what were called in former days "Open Loans," that is to say, when the Government was in need of money, and was raising money, it was the practice to keep an open loan, the nature of which is that any person may lend his money to the Government, in sums, however small, at every treasury throughout the country. Now the result of that system was, that by giving those facilities to small people throughout India to lend their money to the Government, actually we were able to get the money somewhat below the market rate. The practice was to keep this open loan open at a rate, as I have said, somewhat below the market rate; but the demands for such a mode of investment in India are such, that those loans being

Sir G. Campbell, M.P., K.C.S.I.

6 June 1878.

Sir *G. Campbell*, M.P., K.C.S.I.

6 June 1878.

Chairman—continued.

open at any treasury, and at any time, the people brought their money and lent it to the Government at very moderate rates; sometimes considerably below the rate at which Government could have got it by going into the market for tenders in large sums, according to the modern fashion. On the other hand, I am inclined to suppose that the modern fashion gives very considerable facilities for combination amongst bankers and great capitalists. I may illustrate this by the last case in which a loan was raised in India. On that occasion the prices which had for some time prevailed in the market were very suddenly run down by a very considerable percentage. I have not the figures in my mind at the present moment, but this I know, that the Government obtained far less favourable terms than those which the market rate prevailing for some time past would have seemed to justify; and that after the loan was taken up the value of the loan was again run up, and the capitalists who obtained that loan made very considerable profits.

Mr. *Hardcastle.*

2162. When you say that the loan was run up, do you not mean that it was run down before the loan was taken?—Yes, before the loan was taken the price was run down, and after the loan was taken it was run up; I meant that the terms upon which it was lent to the Government were run up.

Chairman.

2163. Do you think that a loan might be obtained locally for the prosecution of local works; for instance, I will assume that some local authority wished to carry out some scheme of public utility, that they received the sanction of the Supreme Government, and that the work is constructed out of borrowed money; if advertisements were sent to the locality in which the work was to be undertaken, do not you think that the bankers and capitalists in that neighbourhood would be more inclined to advance money for such an undertaking, than for a general loan raised by the Government of India?—I hardly think so; I think that the amount of available money in the hands of native capitalists is not such that you could depend upon getting it by loans absolutely free and voluntary in the particular localities. On the contrary, my impression is, that in one or two instances in which that kind of thing has been done, a good deal of official influence has been brought to bear upon the bankers and others who advanced the money, and it was scarcely an operation altogether of a free nature in the market.

2164. I meant that the Government should guarantee the interest?—In case the Government guarantee the interest, I think probably we could get the money in India, but what I mean is, that I do not think we could depend upon getting the money in particular localities rather than in other localities. If you wish to make a local work in the Punjab, for instance, I do not think you would be more likely to get the money in the Punjab, than in the extreme south of India. The parties who lend money would look to the Government guarantee, and not to the local objects.

2165. The object which I had in view was to get as large a number of people as possible to advance small sums to the Government, so as to protect the Government against the combination which you have described?—That has been the whole object of what I have submitted to the Committee, that by inducing a very large number of small people throughout a very large area to lend their money to the Government, you may get it on more favourable terms, and that that process will also be attended with great political advantages: but I do not think that the mere fact that the money is to be applied to make a work in a particular locality, will induce the people of that particular locality to lend their money for the purpose.

Mr. *Sampson Lloyd.*

2166. In speaking of the Government, do you mean the Central Government of India, and not the local government of the district?—I mean the Central Government of India; I think that the whole question of borrowing money ought to be confined to the authority of the Central Government only.

2167. And they would probably lend at a lower rate to the Central Government than to the local bodies, would they not?—I am not sure how that would be, but the Central Government would have the advantage of going all over India to find out where they could get the money cheapest and best, and I think that is a considerable advantage.

Chairman.

2168. You stated that you wished to assimilate the system of borrowing in India to the system in force here; as you are aware, here there are a certain number of gentlemen who are called the Public Works Loan Commissioners, who annually send in a statement to the Treasury of the sum which they expect they will have to advance during the year to different localities, and then the Treasury adopt means for raising the necessary funds, which they do in the shape of temporary loans and Exchequer bonds, but there is nothing of that sort in India?—There is not.

2169. And therefore the whole of the sums which are advanced to any localities come out of the cash balances?—They do.

2170. And the consequences is, is it not, that, although the Secretary of State for India might say, I will refuse to borrow in this country for the prosecution of public works in India, yet the Indian Government might, by advancing to the localities and municipalities sums for the prosecution of local works, so diminish their cash balances as to be unable to meet the drafts of the Secretary of State, and thus force him to borrow in this country?—That clearly would be so; but I presume that the Government of India will have some regard to their cash balances, and that they would not lend their money if there was any risk of their running their treasury dry.

2171. It has sometimes happened that the cash balances were very high at one part of the year, and it was thought advisable in India to utilise the money by making large advances to the localities; there was a falling off in the revenue later on, and the cash balances then were so low that the Government of India were unable to meet

Chairman—continued.

meet the monthly drafts of the Secretary of State, and the Secretary of State was in consequence forced to borrow; do not you think it would be advisable, if possible, to adopt something like the English system, by which a distinction could be drawn between the sums advanced to municipalities and localities and the money required by the Government for the actual service of the year?—I think it would be very desirable indeed that something of that kind should be done. And this, perhaps, may connect itself with an explanation which I was anxious to offer with reference to something which I said on the last occasion on which I gave evidence as respects the dealing with the surplus revenue which is derived from the additional taxation lately imposed upon India, and which it is proposed to devote to the construction of local works. I expressed an opinion that that money ought to be kept in a separate account, and the view which I take in that respect is this, that in times of peace and prosperity you have a normal revenue and a normal expenditure, but then you are liable to extraordinary charges of great magnitude. We know that we are liable to famines which occur from time to time, and it may be that we may be liable to wars, and other extraordinary expenses. Therefore, the Government of India have judged, and I think very rightly judged, that in order to meet those extraordinary expenses of extraordinary years, there ought to be established a normal surplus in normal years, and that that normal surplus should be used to meet the emergencies of extraordinary years. But what I have thought likely to defeat this object is, that no separate account has been kept, and that it seems to be proposed to expend the money upon public works as it is raised. It seems to me that you cannot both pay off debts incurred by former extraordinary events, such as the famine which has just passed over India, or accumulate money to meet future emergencies of that kind, and at the same time spend that money upon public works. If it is spent directly upon public works, the result will be simply that you have increased your taxation for the purpose of increasing the public works of the country; and therefore it seems to me that if you are to apply this surplus revenue of normal years to defray the expenses of the past or the future, you must keep it in a separate trust account. On the other hand, it undoubtedly might be, that whilst we are paying money to liquidate the past famine debts, or accumulating money for future emergencies of this kind, we may, under the rules which may be laid down in respect of the construction of public works with borrowed money, be at the same time borrowing money for that other purpose. It would seem somewhat absurd that we should be paying to the public in one department, and borrowing in another department. Therefore, I would put it in this way, that if you once establish a trust to meet those emergencies, you might allow that trust to lend money to the Department of Public Works, in so far as, under the general rules, that department is permitted to borrow money, and in this way not directly but indirectly, the money which you raise would go for the construction of public works. You would maintain both rules, both the rule which requires that you should maintain a surplus revenue, and establish a fund for meeting

Chairman—continued.

emergencies, and the rule which limits, restricts, and regulates the borrowing of money for public works. You would provide the money for public works without borrowing to an undue extent in the market, and by this system of separate accounts, the full advantage would be gained, and the evil which may result from mixing up the two accounts would, I think, be obviated.

Sir *G. Campbell*, M.P., K.C.S.I.

6 June 1878.

2172. That is very much the proposal which is contained in the form of account which was laid before the Committee, because, under that proposal, it is suggested that the debt of India should be divided into two heads; the permanent debt, which is an unproductive debt, and the debt which has been incurred for public works extraordinary; and any surplus that would remain over and above the ordinary expenditure of revenue would be applied to the reduction of the permanent debt which is unproductive, and then the Government would, in considering their ways and means for the ensuing year, have to raise whatever sum might be necessary to carry on public works for the current year?—That in one sense certainly would be so, and as regards the part of the accounts, which deals with the borrowing of money, I think nothing more could be desired; but as respects the surplus revenue which is raised, I am inclined to think that there really is this practical difficulty; that instead of applying that money in any separate account to paying off the debt, it appears that it is to be applied as it is raised directly to the construction of public works, so that neither will the debt be paid off nor will any fund be accumulated by which future emergencies may be met.

2173. But the proposal to which you allude is a proposal which is contained in Sir John Strachey's budget despatch this year; it does not exactly meet the suggestion which was made by the India Office last year, and which is contained in these accounts; if the proposal which was then made to the Government of India be adopted, I think it will meet your view, because it would enforce the annual application of the surplus to the reduction of the permanent debt?—I have not quite understood the matter in that way; I can only say that, if it is so, then my object would be fully carried out, provided a separate account was kept of the surplus that is devoted to the reduction of the public debt.

2174. And that it is not carried on, as is the custom now, into cash balances of the ensuing year?—Quite so. I should wish it to be understood that, what I do object to, is the proposal of Sir John Strachey, which I understand to be that no distinction is to be drawn between the additional taxation now raised as a special famine emergency fund and the general revenue, and that they are all to be lumped into one, and that the revenues are to be spent as they are realised.

2175. Because they may be applied to the construction of certain works which are presumed to be remunerative, and which may not be remunerative, and therefore you will have increased your debt without having a corresponding increase to your revenue?—I think that fully expresses the objection which I take to the present intention of the Government.

2176. I think you have gone very fully into the different branches of the inquiry; perhaps you would like in one answer to summarise the

Sir *G. Campbell*, M.P., K.C.S.I.

6 June 1878.

Chairman—continued.

evidence which you have given?—In reply to this question, I would confine myself as strictly as possible to the subject which is referred to the Committee, namely, the expediency of constructing works with borrowed money; upon that subject the sum of my views is nearly as follows: Money should not be borrowed for the purpose of constructing public works, except in cases in which either those works are likely to be commercially remunerative, or the money is borrowed upon the security of local rates and taxes, raised for the purpose of paying the interest of that money and establishing a sinking fund for its redemption. Further, in the case of works which are expected to be commercially remunerative, seeing that the most paying works of that kind have already been constructed, and that there is no certainty that other works of the kind will be remunerative, I think that in that case also, those works should not be made unless provision is made by rates or taxation for any deficiencies which may arise, and for a small sinking fund; in other cases I think that the sinking fund should be of a somewhat large and rapid character. In most cases I think that loans for public works should be made on the application and on the security of provinces, districts, or other localities, the representatives of which think that such works are necessary, desirable, and profitable: but in any cases in which the Government of India undertake works of the kind, they should be subject to the same rules and checks as those which I have proposed for localities. There are, I believe, but few cases remaining in which it may be desirable that the Government of India should undertake great works. There is no doubt the Indus Valley, the circumstances of which are such that possibly works might advantageously be undertaken, and then there is the dry tract of Southern India to which allusion has already been made. I am inclined very much to doubt whether there remain any lines of railway which are not now local in their character, and which had not better be left to provinces and localities under the system which I have described. If there be any exception I think that it would be in the case of a Grand Trunk line to connect the North of India with the South, which is still wanting, inasmuch as the present lines afford only very zigzag communication between the North and the South; and there may be cases of lines of railway and canals and other undertakings running through a variety of small provinces, and small native states, in respect of which it may be desirable that the Government of India should undertake the works; but as a rule, as I have said, I think they ought to be left to the initiative and the security of the provinces and localities. Now as regards works for the prevention of famine, I think that they should be subject to the same rules as other works, but looking to the necessities of the large tract of country which has been visited so recently by famine in the past year or two, I believe that special attention should be paid to that tract of country in order to ascertain what can be done for it, and to create the local institutions which may be capable of doing that which is required, where they do not already exist. Possibly also, considering the necessities and the peculiar circumstances of that country, it might be desirable to lend money to the localities on

Chairman—continued.

exceptionally easy terms, upon the same system which has been pursued in this country with reference to certain classes of public works, which it was thought very desirable to encourage. I have alluded to the plain of the Indus as an exceptional case, in which great works of irrigation may, perhaps, with advantage, be undertaken by the Government of India; and it is for this reason that, although I am strongly of opinion that works for the improvement of localities should be thrown as much as possible upon those localities, in this case of the plain of the Indus, you do not so much propose to improve a country as to create a country, as it were, because you have vast tracts in which at present there is no cultivation, and there are scarcely any inhabitants; therefore, it might be almost impossible to throw upon such localities the necessity of raising by taxation the money to meet the expenditure upon great works; and provided that the Government of India can be satisfied that these works would be paying, and advantageous, and that they have provided a sufficient margin of general revenue to meet any possible deficiencies, I think that in such cases the works might be undertaken by the Government of India. However, the general effect of my recommendations would be to tighten, as it were, the purse-strings of the general Government of India, to restrict considerably the number of works which are undertaken as Imperial works, and to extend the system of local loans, provided that those local loans are safe-guarded by sufficient care and supervision, and by an adequate system of accounts calculated to make the thing plain and patent, and to prevent abuses.

2177. There are one or two other points upon which you wish to correct your evidence, are there not?—Yes, there is one very small point. It has been brought to my notice that I made a mistake in a statement which I made regarding the relation between the Port Canning Company and the Calcutta and Port Canning Railway. I have said that that railway was made under pressure from the company. It has been brought to my notice that, in fact, the railway was made some time before the Port Canning Company was formed. That certainly is so, but it is not a matter of material importance, for this reason, that Port Canning certainly was the outcome of private ideas and private enterprise, and not the spontaneous action of the Government. Private individuals obtained concessions of advantages of many kinds in connection with Port Canning, and those individuals it was who brought pressure upon the Government to induce them to guarantee that railway from Calcutta to Port Canning. I believe that I only put the cart before the horse. The fact was that the company was not used as a means of constructing the railway, but the railway was one of the means which were used in order to get up the company, that is the only difference. Then I mentioned the canal proposed by Sir Arthur Cotton from the Ganges to Calcutta; I have alluded to the proposal for a canal which was to run along the western side of the delta of the Ganges, but I have lately seen papers from which I understand that Sir Arthur Cotton's more recent proposal is somewhat different, namely, a canal which

should

Chairman—continued.

should run from Calcutta north-east to a point somewhere near the terminus of the Eastern Bengal Railway. I gather that that proposal of Sir Arthur Cotton's is to have a high level canal, which is to be supplied with water by pumping. I am not in a position to give an opinion upon that, but I find that Mr. Leslie, who is a very excellent engineer, has expressed his opinion that the canal will cost a very great deal more than Sir Arthur Cotton supposes. I find that he specially alludes to the large amount of drainage which will have to be passed. In that respect I should like to say that although I am quite aware of the great advantages and desirability of canals connecting Calcutta with the east of Bengal, on the other hand I have also seen a great deal of the immense amount of water-way which is required upon the Eastern Bengal Railway; and of this I am certain, that the expense of carrying a railway upon latticed bridges over that large amount of water-way would be a mere bagatelle, compared to the enormous expenditure which would be required to carry your canal over the same amount of water-way, because while a railway is carried upon a latticed bridge, a canal can only be carried over upon immense masonry aqueducts, which would cost enormous sums, and in my opinion, a canal constructed in that way would be very much more expensive than a railway, and consequently much less paying.

Mr. *Fawcett.*

2178. You have already said that you are strongly in favour of the decentralisation scheme; is there not a danger that under that an intricate and widespread system of local taxation will arise which will be a good deal kept out, as it were, of public view; and that consequently a great amount of discontent may be created through a cause which, to the general public, is almost imperceptible?—I think not; I think that local taxtion of that kind may be created, but it certainly would not be kept out of the public view for this reason, that as I have just stated to the Committee, the local councils are open councils of a popular character, and it would be quite impossible that any taxation which was imposed by means of those local councils should be at all hid away, or should be otherwise than very freely and openly discussed. Up to the other day, at all events, we had a very free press in India, which discussed those things with extreme freedom; and there are still one class of papers which remain free, and which are still likely to discuss those questions. I therefore do not think there is the smallest risk that the people of India will be betrayed into abandoning that impatience of taxation which they have in common with the rest of the world; and if taxes to some extent are imposed for those local purposes, it will not be without full local discussion, and a full consideration of local interests and local feelings in the matter.

2179. I am rather referring to the knowledge of the subject in this country, that Indian finance may be represented as showing a considerable reduction of Imperial taxation under this decentralisation scheme, and may be described so in the House of Commons, when at the same time there is a considerable increase in the aggregate

Chairman—continued.

taxation, owing to the growing up of local taxation?—To some extent it may be so. Local taxation would not be so prominently brought before this country as Imperial taxation; but on the other hand, I am inclined to believe that any taxation which is disagreeable to the people of those particular localities, which would be disagreeable to the people of Bengal, or the people of Madras, or the people of Bombay, will certainly be brought to notice in this country, and that it is not likely to escape attention; although taxes which have been accepted by people, and which are not the occasion of denunciation and of great public discussion may, to a certain extent, avoid the knowledge of this country. I may instance the Bengal road cess. If there had been a violent opposition to the collection of the Bengal road cess I believe that we should have heard of it fast enough in this country; but inasmuch as there is not opposition, and the tax seems to have been accepted by the people of every class without much noise or invective in the newspapers, it is the case that people in this country do not know very much about it.

2180. Do you propose to place the amount and form of this local taxation under the control of the central authority?—Only to the extent to which it is now under the control of the central authority; that is to say, Acts of the local legislatures are not valid until they have the sanction of the Viceroy, and the local Acts are also sent home to the Secretary of State, who has the power of disallowing them. That seems to me to involve sufficient check.

2181. With regard to this emergency fund which has been raised by the financial arrangements of the present year, the amount of money which is to be spent upon public works is not absolutely fixed, is it; and is there not some danger that the Government obtaining additional revenue will be encouraged to spend more on what may be described as speculative undertakings like public works, and that consequently also an increased taxation has been imposed in India for the sake of either creating an emergency fund or paying off the debt which is incurred owing to famines, and that when the next famine should occur there will be practically no fund and no debt reduced; but the only result of this additionall taxation will be a certain number of public works which may or may not be remunerative?—That is exactly the danger to which I have pointed, and against which I should desire to guard, my proposal being that the system of borrowing for public works should be protected by very stringent safeguards; that only under certain conditions, and under certain circumstances, and with certain security, should money be advanced for those public works; then I think that if emergency money is really lent under those stringent rules, you do not incur the same dangers which you would incur if the money is spent without being subject to the process of being put into one account under certain rules, and being lent into another account under certain other rules.

Mr. *John Cross.*

2182. With regard to the opinion which you have expressed as to the necessity for a sinking fund to repay the money borrowed for public works, I should like to ask you, do you not think that the indirect advantages accruing to a district

Sir *G. Campbell,* M.P., K.C.S.I.

6 June 1878.

Sir *G. Campbell*, M.P., K.C.S.I.

6 June 1878.

Mr. *John Cross*—continued.

in which public works are made, do away with the necessity for any sinking fund, supposing the return from those public works should be satisfactory?—No. In my view, the indirect advantages are of so uncertain and variable a kind that I should not like to mix up that question of the indirect advantages with the question of a sinking fund. I recommend a sinking fund upon a totally different ground, namely, that looking at the matter from a purely commercial and financial point of view you must consider that the greatest works are liable to wear out; that they are liable to be superseded by new inventions, that the habits of another generation may change, and works which are beneficial and profitable in one generation may not be so beneficial and so profitable, and may not be so well appreciated by another generation, and upon those broad grounds I think it is right that any work of this kind should be supplemented and secured by a sinking fund which will extinguish the capital after a certain term of years, long or short.

2183. Do you think that there is more necessity for a sinking fund with regard to public works in India, than there really is with regard to a sinking fund to repay possible outlay on railways in England?—I think so. I think there is a greater necessity. My own view is so broad that I should like to apply it more or less to all countries equally, to India and to this country; but there is a much greater necessity in India, because for one reason, the elements of nature are more violent in India, and the works are much more likely to be disturbed by cyclones and great climatic disturbances than they are in this country; and it is undoubtedly the case that the climate is such as that everything wears out in a much shorter time than it does in this country. Also, I think, that in India both as respects engineering and as respect other matters, your system is much less settled and certain than it is in this country. You are much more apt to take a leap in the dark with regard to public works. I think that you are much more liable to risk, and much more liable to change and uncertainty in many ways there than you are in this country, where you have a much more settled system, and also a much more settled climate.

Mr. *Ernest Noel.*

2184. As I understand you, you would give the local governments free power to impose fresh taxes and to enable them to give securities to the Government of India for money advanced to them for local public works. Do you think there are several sources of income that the local governments have that are not already nearly exhausted?—I should begin by saying, that I did not say free power; on the contrary, I said power subject to certain stringent checks, and to the supervision of the Government of India, and of the Secretary of State, by whom I have no doubt that any indiscreet exercise of such powers would be very readily checked. But as regards the exercise of such powers, I am inclined to suppose that there are very much the same sources, the local rates, that there are in this country. To begin with, I do not doubt that since private landed property has been created by us, since there exists a private landed property yielding a large private income apart from the Government

Mr. *Ernest Noel*—*continued.*

Land Revenue, that is a fair subject upon which local rates may be imposed for local purposes and local benefits; and also I am inclined to think that it may be quite possible to impose local rates which shall touch personal property outside of that real property, which is the usual subject of local taxation. I do not think that the taxation of India, either general or local, has been carried to that point, that it may be considered to be exhausted. I am very much inclined to think that a local income tax locally imposed for local purposes, is a resource which is still available; then I think there are other subjects of taxation which possibly, if not used for the purposes of general taxation, might be made the subject of local taxation. The octroi of towns involves a certain amount of taxation of articles of local consumption, and I should not at all despair of the possibility of trying a local taxation of tobacco in certain districts. I am far from thinking that the means of taxation in India are exhausted; on the contrary, believing as I do, that a great part of the revenue now drawn from India is not taxation but income, which may be considered to be derived without what we properly call taxation, I consider that the personal taxation of India is very small indeed, and that if we are to improve the material advantages which India now enjoys, there are means by which taxes may be raised to defray the expenses.

2185. You therefore think, do you, that the local governments could raise taxation without reducing the impatience which would be caused by the same taxation if imposed by the Central Government?—I think there are cases in which it might be so. I think that the local governments better understanding the necessities and feelings, and capabilities of their own people, might in many instances impose local taxes in particular provinces, and particular localities which would not be suitable to the whole of India, and which, if imposed universally throughout India by the Government of India, would cause impatience and discontent, which very likely would not be caused in particular localities to which they are especially suited.

2186. And, perhaps, there would be less feeling against them if they knew that it was for local purposes and not for Imperial?—That is very strongly my opinion, that there would be very much less impatience and very much less discontent if the people knew that the taxes or the rates imposed were distinctly for local purposes, and would be administered by themselves. And that view has grown in my mind in consequence of the success of the road cess in Bengal. I may mention that what I may call the extreme success of that measure has been a very great surprise to me, seeing the very strong opinions which were entertained by many capable people that a rate of this kind would cause great difficulties and great discontent. I myself imposed it with very great misgivings; I had not the least idea that it would be so popular and that it would be so successful as it has been, and I confess that the result of that measure has been to impress me very greatly with the belief that the people of India are not so impatient of reasonable taxation as we had been inclined to think, that they are quite accessible to modern ideas to a degree which we had not supposed; and provided

Mr. *Ernest Noel*—continued.

vided that you treat them fairly, and that you impose only reasonable and moderate taxes for reasonable and moderate purposes, and let them thoroughly feel that the money does go for their own benefit, and especially that it is administered in some sense by themselves, they are really quite as capable as Europeans of appreciating the necessities and benefits of a system of that kind; and therefore I have certainly very much come to the belief that we must not be too timorous, and that we must not on account of our ignorance of India fail to do for the Indians what we should think that we might not unreasonably do for our own people.

Mr. *John Cross.*

2187. Is the road cess imposed upon all the cultivators?—Yes, upon all the cultivators. The system is that to which I was accustomed in Scotland, namely, that one-half is paid by the owner, and one-half by the occupier, and consequently, of course, every cultivator pays.

Mr. *Sampson Lloyd.*

2188. Is it not the fact that when the income tax was imposed in India the opposition to it which was ultimately successful in getting it abolished, arose much more strongly from the Europeans and the richer natives than from the masses of the people?—I think that was decidedly so. There was very strong opposition on the part of the Europeans, and to my view to a certain extent a just opposition, because it is one of the evils of the income tax that the Europeans were harder hit than other people, inasmuch as first of all their incomes were disclosed, and there was no hiding them in most cases, and secondly, Europeans in India receive for a short period an income which is more of the character of capital than of income, inasmuch as it is a provision which they make for the rest of their lives during the short period which the climate enables them to remain in India. But speaking generally, I have a confident belief that the strong opposition which arose to the income tax was, as the question implies, much more the work of the Europeans and the richer or less poor natives than of the masses of the people, who in fact were not affected by it.

Mr. *Hardcastle.*

2189. With regard to your ideas of raising loans by small contributions, has that been tried in India?—It has so far been tried that certain loans have been made to localities upon the general security of their rates and taxes.

2190. I mean keeping an open loan to enable small capitalists to contribute; has that been tried?—That was the system which was adopted in India for very many years. The objection which was brought to that, was that by keeping an open loan without limiting the amount, the Government was led into extravagance, because they had as it were a kind of perennial supply from which they derived money; but my suggestion would be this, that under the system which now prevails of constructing great public works, for one purpose and another, as a matter, of fact, whether it be for ordinary purposes, or whether it be for extraordinary purposes, year after year the Government always do borrow,

Mr. *Hardcastle*—continued.

and therefore special temptations to extravagance would not exist, inasmuch as we should be merely borrowing in one form what we inevitably, and as a matter of fact, do borrow in another form.

Mr. *Balfour.*

2191. You said, did you not, that the rate of interest at which they borrowed in the open loans was rather under that of the open market?—Almost invariably under.

2192. I suppose that the cost of raising a loan upon this system was considerable?—No, not at all; in fact, I may say that the cost was nil.

Mr. *John Cross.*

2193. There must be some official expenses; it is like the establishment of a number of small savings banks throughout the country?—No doubt in some shape or other there must be some expense, but practically it was not felt because we had treasuries, with large office establishments throughout the country, and the additional amount of work thrown upon them by this system of borrowing was so infinitesimal, so unappreciably small, that I think it can hardly be said that the establishment throughout the country would be increased by a single clerk owing to a system of this kind.

2194. You would recommend a system something like the English savings bank?—I would, certainly. We already have a system of savings banks, but they are on the other hand confined to almost too minute sums and scarcely meet the wants of that lower and middle class, who might want not merely to deposit their petty savings, but to invest sums which would amount to sensible loans.

2195. What is the rate of interest allowed now on sums deposited in savings banks?—I am not quite sure; I think it is 3½ per cent. I think that we do not encourage savings banks so much as we might. I think that the political and social advantage of savings banks is so great, that even if it involves some little loss to the Government in point of establishment, it would be better to give interest more nearly approaching the market rate.

2196. The market rate for Government loans being about 4 per cent.?—Yes, or little over.

Mr. *Hardcastle.*

2197. Under the presnt system, I presume that a loan for a certain amount of money is sanctioned by the central authority, and then issued by arrangement with bankers or other capitalists?—That is so.

2198. Would there be any difficulty under this open system of small loans, in limiting the amount that might be issued in that way, and thereby preventing the possibility of extravagance?—I think that might be done. With respect to savings banks, I should like to explain this, that the deposit of money in a savings bank is a different thing from a Government loan, because it is not transferrable; the deposit of money in a savings bank is merely a temporary investment which may be drawn out by the investor, and by him only, but a Government loan is a permanent investment, and in India it takes the shape of what is called "Government paper," which is a transferrable security which a man

Sir *G. Campbell*, M.P., K.C.S.I.

6 June 1878.

Mr. *Hardcastle*—continued.

can hold, and can make over to his heirs, or to anyone to whom he deires to make it over; he can transfer it to any shape. My impression is, that that would be a form of security which would be very much preferred to that of ordinary savings banks.

Chairman.

2199. Do you think there are any papers at the India Office which might advantageously be put in evidence before the Committee?—Yes; I have the belief founded on my own experience as regards the history of the famines of 1770 and 1783, that the records of the India Office contain the materials for a history of all the famines

Chairman—continued.

which have occurred during our rule in India, and that it would be very desirable that it should be obtained by the Committee; also, I believe that there are the materials for constructing a good physical map of India, which would make plain to the eye the physical features, and in which, of course, mountains and rain-currents, and other features of that kind, which very intimately affect the question before the Committee might be shown; great facilities would be afforded to the Committee if those things could be done.

2200. Would they give more information than is contained in the maps in the report to which you have alluded?—Yes, to some extent.

Thursday, 20th June 1878.

MEMBERS PRESENT:

Mr. Agnew.
Sir George Campbell.
Mr. John Cross.
Lord George Hamilton.
Mr. Hardcastle.
Mr. Sampson Lloyd.
Mr. Mulholland.
Mr. Onslow.
Mr. Edward Stanhope.

LORD GEORGE HAMILTON, IN THE CHAIR.

Lieutenant General Sir ARTHUR COTTON, K.C.S.I., called in; and Examined.

Lieut. Gen. Sir *A. Cotton*, K.C.S.I.
20 June 1878.

Chairman.

2201. BEFORE you give any evidence to the Committee, perhaps you will be kind enough to state to the Committee what service and experience you have had in India?—I went to India in 1821; in 1822 I was appointed to what was then called the Maharamut Department, that is to say, the Department of the Repairs of Public Works; I continued there until 1824, when I went to the Burmese War. In 1826 I was re-appointed to the Tanks Department, and I continued in that until I left India in 1853, and I returned again in 1857 for two or three years.

2202. Since you left India you have taken a very lively interest, have you not, in this question of public works?—Yes.

2203. It would perhaps be convenient if we were to divide into certain heads the evidence which you wish to give, and therefore the first question which I would ask you is, what is your opinion as regards the remunerativeness or direct returns from public works in India?—This is my first point, that in this case the great question is not what are the direct returns to the Treasury from any public works expenditure, but what is the general and total effect upon the country; that is, the Government are not in the position of a private company, but of statesmen. I grant that it is a question which must be attended to, whether a work presses upon the finances or strengthens them, but I beg to offer that it is not the first question or the most important one; for instance, the Tanjore works have been the principal means of raising the condition of 2¼ millions of people to such a state of wealth and prosperity as we may safely believe no district of India ever attained to before, and have besides secured the population from famine up to this time. They have indeed, at the same time, been probably the chief means of raising the revenue from 420,000 *l.*, previously to the works, up to 750,000 *l.* at present, an increase of 330,000 *l.* a year. Now, though a third of a million in one district out of 160 is really something considerable, it is surely quite secondary to the effects upon so large a population. This is an instance of what has been done; and, on the other hand, we may take an instance from what has not been done. We have the

Chairman—continued.

most dreadful accounts of a fatal fever raging round Calcutta for many years which has occasioned a frightful mortality (I propose to read some extracts from official papers on this subject); they attribute this calamity to the want of the regulation of the water, affecting the case in two ways, first, in draining the tract in the monsoon and supplying wholesome water for the people; and, secondly, by irrigation providing better and more abundant food, for the accounts of the utterly inadequate feeding of the people are perfectly astonishing. Now, in this case, surely the relief of the population from this dreadful fatal fever, and from absolute want of the necessaries of life, is the primary point, and the question of whether works returned three or five per cent. a secondary one. I beg to offer one more instance: Mr. Leslie, the engineer who constructed the East India Railway, has shown that it carries one-tenth of the Eastern traffic, leaving the rest to go 300 miles round by the rivers; this is besides the western traffic. Surely the nine-tenths that are left behind are of more importance than the one-tenth that is carried, and than the six or seven per cent. that the railway yields.

2204. I believe you wish also to express your views as regards transit and the cost of transport?—I may just repeat that my first point as to the great question is, what are the general effects of the works upon the whole community, and not the mere money returns to the Treasury. The next point that I would wish to offer some remarks upon is transit. My great point in this matter is, that I have so far changed my former views that I consider this the primary question in the material improvement of India, and before that of irrigation in importance. Now we have before us this most awful fact, that from 10 to 25 per cent. have perished in Madras districts while there was food enough in India, and therefore solely from want of efficient transit; I am afraid we must reckon that out of the 40 millions affected by the famine in Madras, Mysore, Hydrabad, and Bombay, four or five millions have perished, after spending 120,000,000 *l.* on railways, besides incurring a debt on them of 50,000,000 *l.* Let us look at these two facts, that one of the most successful railways leaves

Lieut. Gen. Sir *A. Cotton*, K C.S.I.

20 June 1878.

Chairman—continued.

behind nine-tenths of the present traffic instead of creating as much more, and that 4,000,000 perish in a famine while there is food in India, and consider whether the subject of transit is understood. What are the great points in this question? Surely the first of all is, How much we have got to carry. Now I have read scores of Blue Books and other official papers on this subject, and have not yet seen one that touched upon this point. What should we think of a man who was preparing to travel and forgot to consider whether he had to provide carriage for an ass load or an elephant load. So a railway engineer, as soon as he has finished his railway, writes to show that after 12 years' trial and an expenditure of 3,000,000 *l.*, besides a debt of 1,000,000 *l.*, it leaves behind one and three-quarter million tons of goods, and causes a loss of 2,000,000 *l.* sterling a year for want of effective transit; but we do not make lines of transport merely to carry what was carried before. The great effect of efficient means of transit is to create traffic; that is, to enable producers to send to a distant market what was before unsaleable, because he could not reach that market at a practicable cost of carriage. On the main line in Godavery there was formerly carried some 10,000 tons; now that they have effective transport, 200,000 tons are carried. So on the line from Calcutta to Loodiana, the question is not about the 300,000 or 400,000 tons the railway carries, nor about the greater quantity that still goes by the river, but about the millions of tons which a healthy development of the country requires; thus the wheat trade entirely depends upon the cost of carriage being reduced; by land it costs 2 *l.* a ton for 1,000 miles, or 1 *s.* a bushel, while all but an insignificant portion of this would be saved by effective water carriage; and upon this 1 *s.* a bushel will constantly depend whether England is supplied with wheat from the United States or from India. And so with all sorts of things; with a thoroughly good means on this line I have no doubt that 3,000,000 tons would very soon be carried, and what it would come to ultimately, who can estimate? Now this is quite certain that a railway could not convey 3,000,000 tons. The next point in this question is how to carry cheaply; if we have to carry 3,000,000 tons to Loodiana, at the average railway charge of a penny, it would cost 7,000,000 *l.*, and at their lowest charge of a half-penny, 3½ millions. If carried by steam-boat canal at 1-10th of a penny, it would cost 700,000 *l.*, a difference of 2¾ millions a year, the interest of 70,000,000 *l.*; but Mr. Leslie shows that there would be a saving on the eastern and western traffic together of 2,000,000 *l.* (on the present traffic) on that first 130 miles, as compared with what is now paid; that is the first 130 miles from Calcutta to Goalundo, the confluence of the Ganges and the Bramapootra. Thirdly, let us compare more particularly the two means, land and water carriage: we have first the capital required; the railways have cost from 6,000 *l.* to 24,000 *l.* a mile, and the canals fit for steamers of 250 tons, from 1,000 *l.* to 6,000 *l.* Secondly, the cost of carriage by the two means: I feel sure that on long lines the expenses will not exceed one-tenth of a penny; more likely one-twentieth. In the United States the cost is stated to be one-eighth. In India, with men's wages at 4 *d.*, against 6 *s.* in America, it could not be half what it is there.

Chairman—continued.

In Godavery, with little boats and short distances, it is one-eighth. Thirdly, the quantities: the railways could not carry even the insignificant quantities required in the famine, while canals could certainly carry an unlimited quantity; besides these essential and insuperable defects in railways, there are several others of the greatest importance, such as being able to load only at stations, &c.

2205. I believe you wish to compare the direct results of the two divisions of public works, namely, railways, as against irrigation, with navigation?—Yes. The railway account now stands thus: cost of works, 112,000,000 *l.*; cost of land, about 8,000,000 *l.*; debt in 1869, 21,000,000 *l.*, now 50,000,000 *l.*; total, 170,000,000 *l.*; for which we have about 7,500 miles, or at the rate of 23,000 *l.* per mile; and the present cost to the Treasury is, interest on share capital, 4½ millions, and on land and debt at 4 per cent., 3,000,000 *l.*; total, 7½ millions; from which deducting net receipts, 4½ millions, leaves 3,000,000 *l.* a year as the loss on the money sunk. The capital spent on the waterworks, including the Toombudra, is 16,000,000 *l.* The accumulations of interest against the Buree Dooab, the Ganges, and other canals, are much more than balanced by those to credit on the Cauvery, Kistna, and Godavery works, which have at least 10,000,000 *l.* to their credit, leaving a balance in their favour of 5,000,000 *l.*; so that the money sunk may be taken at 11,000,000 *l.*; the interest of which at 4 per cent. is half a million; against which we have a net profit over working expenses of about 1,000,000 *l.*, leaving a net gain to the Treasury of half a million a year on irrigation works, against a net loss of 3,000,000 *l.* on the railways. I, of course, cannot state all the particulars here, but this is undoubtedly a substantially true statement of the case. One of the witnesses has correctly insisted upon this calculation of the accumulations of interest on the Ganges Canal. I heartily approve of this honest dealing with the matter, for it is the truth; and when this principle is applied to the other irrigation works that have paid enormously beyond their proper interest, and to the railways, it brings into a strong light the difference of the results of the two modes of spending money in respect of this minor point of the direct returns to the Treasury.

2206. What is your next point?—The fourth main point which I wish to refer to is, the total results to the country. And first, with respect to the grand point of all, namely, the saving of life, one thing is quite certain, that so far as our irrigation works extend, they have completely protected the people from death by famine, and we have no reason whatever for supposing that they will not always do that. On the other hand, without exception, the railways have totally failed in this essential point. Many millions have died in all the districts through which railways were in full operation, especially in the last famine in all the Madras districts, on each of which, on an average, 1,000,000 *l.* has been spent in this way, besides the millions that were spent on the railways that connect those districts with the tracts from which the grain was brought. Millions have perished in this dreadful way. There can be on possible question, therefore, on this point, that in this fundamental particular the irrigation and navigation has been a complete success,

Chairman—continued.

success, and the railways a complete failure. In the evidence of one of the witnesses before this Committee, it was said, "But then you must consider that whereas railways have no drawback whatever, &c.," could words be in more direct contradiction to facts? Compare them with the unquestionable statements that in those very districts in which 27 per cent. have died, a million had been spent on railways. And the last Railway Report states that the profits on those Madras railways were 230,000 *l.*, and the guaranteed interest 500,000 *l.*; a loss of a quarter of a million, besides the interest on the price of land and the debt, now amounting together to about 10,000,000 *l.*, making together an annual charge upon the Treasury of near three-quarters of a million. This loss of money, with that of about 3,000,000 of lives in Madras alone, are no drawbacks whatever. How inconceivable it is that such things should be said in the face of facts that every Member of the Committee knows, and everybody else. Under this fourth main head, my second point is the results of the two kinds of works in ordinary years. What is the ordinary increase due to irrigation?—Up to the present time no information seems to have been given to the Committee on this point, which is very strange, for surely it is a fundamental one. How can we possibly form a judgment on the advisableness of irrigation or otherwise, if we do not know what benefit it gives in this primary respect? In Godavery we used to reckon that it increased the crop in grain only, by 20 rupees an acre, at least. In the North Western Provinces, by a paper I saw, I think by General Dickens, where it was carefully investigated, the increase was reckoned at 15 rupees. And by a paper on the results in Orissa, written some years ago, it was stated at something under that. I see now that it is reckoned at less; in very favourable years, as respects rain, not more than four rupees; but this, I have no doubt, was where they did not empty the fields of rain-water and fill them with the rich river-water. At one time they were doing this in Midnapore, but I do not know whether they learnt to do this generally. I do not think that it can be less than 1 *l.* a ton on an average of years there. Taking the lowest of these, it is at 7 per cent., the interest of 14 *l.* per acre; but this is besides the cheap transit, the drainage, the security from river floods, the abundance of forage, the supply of wholesome drinking-water, &c. The cheap transit alone, allowing for half a ton carried 50 miles with a saving of only 2 *d.* a ton a mile, would be two rupees an acre for the carriage of the produce in grain alone, so that the whole saving from this must be more than the whole water-rate. But what should we say to the effects of passenger transport? In Godavery they are carried at eight miles for 1 *d.*, and the canals are crowded with passenger-boats, as one of the witnesses has already shown. This perfect liberty of intercourse is the very life of the district. If all India were supplied with such cheap passenger transport, where the passengers could be taken up and put down anywhere, and every one was free to travel either in his own boat or by any passenger or goods boat, at any hour of the day or night, and at any speed, without having to wait for a train or go to a station, it is impossible to estimate the benefits it would confer. On the other hand, the railways carry only, on an average,

Chairman—continued.

190,000 tons per annum; quite an insignificant quantity, compared with that required on these great main lines; only as much as is carried on the main canal in Godavery, an isolated patch of country far from any of the great cities; and, as we have seen, only one-tenth of the present traffic on one line of which Mr. Leslie speaks, and this at a cost which does not at all meet the wants of India. They also carry on an average 350,000 passengers, or 1,000 a day; certainly not a fifth-part of those who would travel on these great lines if they could travel cheaply, and without all the drawbacks of the railways. One proof how sadly the railways fail in the passenger traffic is, that the average price of a ticket is 20 *d.*, showing an average distance of 70 miles, so that they scarcely touch the small local traffic. In England, the average price of a ticket is 1 *s.*, making the average distance for all England 10 miles, against 70 in India; a most remarkable fact as to the real operation of the railways, and, even if they did really accommodate the traffic on the main line itself, this is an insignificant thing, compared with the traffic throughout the country. What would the state of Godavery be if, instead of the whole delta being pervaded with transit at one-eighth of a penny over 500 miles of irrigation canals, the whole 700,000 *l.* had been spent on 80 miles of railway, carrying at a farthing. Even if this 700,000 *l.* had given Godavery nothing but such a passenger transport over 500 miles, it would have been a benefit immeasurably greater than that of 80 miles of railway. The fact is, we must state the effects of the railways rather by what they do not do than by what they do do. They do not provide food for man or beast; they do not carry the great traffic of the country; they do not carry cheap enough to answer the main purpose; they do not touch the local traffic, either of passengers or goods, perceptibly; they do not pay the interest of their cost and debt; they do not drain the country; they do not provide wholesome drinking-water; they do not prevent fever; they do not create traffic; and what is a most important point, in case of disturbance it will be impossible to protect them, because you cannot patrol them with trains of armed men while the ordinary traffic is running. Of all helpless things in the world railways are the most helpless in times of disturbance. In short, as a chief railway engineer said to a friend of mine, they are not suited at all to the circumstances of the country, and India is, at this moment, in as great want of a complete system of water carriage, as if no railway existed.

2207. What is your next point?—My fifth main point refers to the objections which are often started to irrigation with navigation. First fever; my answer to this objection is, that I have lived all my life in the paddy fields, and never had myself, or knew of an attack of fever in others from irrigation. I have had innumerable fevers in India, but always in the unirrigated districts. No doubt there are instances of fever produced by irrigation in some localities; but they certainly are the exceptions, and not the rule; and we know that in many cases they have been owing to incomplete drainage. But on the other hand are there no fevers for want of regulation of the water? Beyond all comparison the worst fever I ever heard of is that which has pervaded Bengal for years. I have two reports by Colonel

Lieut. Gen. Sir *A. Cotton*, K.C.S.I.

20 June 1878.

Chairman—continued.

Haig and Mr. Saunders, a medical inspector, on this subject, containing the following expressions: "The frightful mortality;" "of the poor suburban villagers scarcely one regained his former condition, and large, very large numbers of them died;" "I have myself seen whole mohullas deserted in Burdwan, where I am told three-fourths of the whole community had died," and so on. Now if this awful mortality was going on for years under the very eye of the Governor of Bengal, who of course did his utmost to check it, we must conclude that if there is fever in some cases from irrigation, there is incomparably more in others from want of it. It is very remarkable that in the former evidence there is no mention at all of this, the most terrible fever we have any account of in India. On these reports being received by the Viceroy, he ordered the matter to be thoroughly investigated, but nothing has been done to this day, though both the engineer and the medical officer most urgently insisted on immediate measures being taken to regulate the water, and by drainage to carry it off in the monsoon, by irrigation to improve the food of the people, and to supply them with wholesome drinking-water. I beg most earnestly to press upon the Committee the perusal of these two terrible reports, that they may have some idea what Bengal is suffering from want of irrigation and its accompaniments. These reports were dated in 1873. The next objection to irrigation is the efflorescence called reh; my first answer to this also is, that I never saw an instance of it. It also is quite an exceptional thing, and therefore is no more a reason for giving up irrigation than a death on a railway in England is an argument for abolishing railways here. A third is, diminished produce; the answer to this is, that at least 20,000,000 of acres from one end of India to the other have been irrigated for hundreds of years, both from rivers, tanks, and wells, without any diminution of produce; so that this also must be quite exceptional. This is the way the Trichinopoly ryots in an address to the Governor of Madras, after hundreds of years of irrigation of the same land, speak of the effects of irrigation: "All which works (the great irrigation works of their own and other districts) have converted the tracts affected into" (What? Depopulated deserts? No.) "into scenes of matchless fertility and wealth, and have for ever protected them and the neighbouring districts from the disaster of recurring droughts." If, therefore, there are instances of injury of this kind from irrigation, the exceptional case should be investigated. A fourth objection is the refusal of water. This is also quite exceptional. In Madras, out of thousands of works, we have only had one single instance of any difficulty of this kind. Of course, therefore, there can be but one explanation of the matter, namely, that there has been some egregious blunder in the management. This is now acknowledged by the Madras Government, and they have set about heartily to put things to rights by sending a special officer whose sole business it is to remove all obstacles, and take measures that the water is no longer allowed to run to waste. In a Government Minute it is written, "The company have real cause of complaints." Again, "The Collector of Kurnaul reports that the manager of the company had real cause of complaint in consequence of the wording of the vernacular instructions, &c." These are

Chairman—continued.

extracts from the Government Minute. The Governor accordingly appoints a special officer selected on purpose for this duty. In the only other instance of this difficulty in all India, that is in Orissa, I have no doubt that the same thing is required; but there the difficulty is already in a measure removed. My letters say that near 100,000 acres were watered last year, and it is expected that as much will be taken on a five years' lease this year. But here the difficulty is terribly aggravated by the wretched state of the revenue arrangements, as has been pointed out by one of the previous witnesses. Of the terrible state of these districts under the zemindary system I have not time to enlarge here, but scores of persons witness to them. I was first instructed in these things by a former Governor of Bengal, whose account of the state of things agreed with what has been given in evidence to the Committee, though, of course, he spoke somewhat plainer in private. I need only refer the Committee to the two reports I have before spoke of, from which they cannot but form some idea of the dreadful mistakes that have been made in some cases in India, in the midst of our undoubted generally most able, faithful, and successful rule there. But when we see that under the very eye of the Viceroy and the Governor of Bengal, two such terrible evils as this most virulent fever from want of irrigation, and the loss of two millions a-year, from the want of effective transport on a single line of 150 miles, exist in the immediate neighbourhood of Calcutta, the Committee cannot but see that unquestionably such an inquiry as this, and that by the Famine Commission in India, is peremptorily required. Another objection to these great works that has been made before this Committee is the great expense of locks in making the canals navigable. This is a mistake. The cost of locks is about 500 *l.* a foot of lift, and as the fall of the country from Loodiana to Calcutta, for instance, is less than a foot a mile, the cost of lockage would be only 500 *l.* a mile if the whole line were to be reduced to dead levels, which it would not, so that the whole cost of that line will not be more than 3,000 *l.* or 4,000 *l.* a mile, against 24,000 *l.*, the total cost of the railways. On the line of the Poornah, to connect the east and west coasts by the line of the Godavery, the fall is about 3 feet a mile; but, on the other hand, on 90 miles of the Godavery and Kistna Canal, there is one lock of 12 feet. The cost of the locks, therefore, on all the main lines of India is by no means a serious objection. If the canal, north and south along the line of the Carnatic, to supply the tanks, is constructed, there will be 600 miles without a lock. Another objection that has been started is the evaporation of the water; this is quite an insignificant matter. Another objection is the great cost in upland districts. My first answer to this is: "But what has this to do with the question of irrigating the hundreds of millions of acres in the plains of the Ganges, the Indus, and the Bramapootra? The practical man does not trouble himself with what cannot be done till he has finished all that can be done. But, further, we have already a perfect instance of upland irrigation in the grand work of the Madras Company; here they distribute 400,000 cubic yards an hour for seven months, making 2,000,000,000 cubic yards per annum, sufficient for 200,000 acres of rice and 600,000

Chairman—continued.

600,000 acres of dry grains, for 1,600,000 *l.*, giving an average of 2 *l.* an acre, where the increase of produce will be at least 2 *l.* per acre also, or 100 per cent. There are hundreds of millions of acres of upland country similar to this. A further answer to this objection is that all over an immense part of the upper country there are innumerable works of irrigation now existing, both tanks and canals. I may refer to Meadows Taylor's life to show what both intelligent Europeans and natives think of irrigation works and their practicability in the upper country. The whole of the country that the Trichinopoly ryots were speaking of irrigating is of this kind. They were not speaking of delta land; they were asking the Government to irrigate the upland. I think these are all the objections which have been raised to irrigation and navigation, and I beg to urge the answers of an experienced man who has surely shown himself in some measure a practical man, by what he has been allowed to do. There have been great men connected with India in past times, both black and white men, who were not a bit afraid of engineers and cold water, resolute men, and I hope we shall see such again if we live.

2208. There was certain evidence given by previous witnesses with which I believe you do not agree; will you state to the Committee the points upon which you differ from the preceding witnesses?—First, with regard to the Cauvery works, it has been stated that they do not return 87 per cent., as stated by the Madras Government, but no proof whatever is given of this. It is a bare unsupported assertion. I think that an official paper ought to be, at least, met by some figures. It is also stated that there has been very little additional land irrigated since the new works. There is nothing whatever to support these assertions. I have not the extent of irrigated land before the works, but I have the actual returns of the district showing the wet assessment. It was in 1832, 238,000 *l.*, which, at an average of 5½ rupees per acre, gives 420,000 acres of Government irrigated land. In the evidence this was stated at 800,000 acres. There can be no possible mistake about the extent which I state. It is taken from the official returns of the district. The present wet assessment is 370,000 *l.*, and the area 740,000 acres; an increase of 320,000 acres in the Government land alone, besides that in the zemindary lands. The total irrigated land is given in the Administration Report at 920,000 acres. I think this still omits some class of land, but no further information is given by the report. This increase of 320,000 acres is besides a proportional increase of zemindary lands, which would be about 80,000 out of 180,000, making 400,000 acres. Besides this, there is the increase in South Arcot and Trichinopoly, in which districts about 150,000 acres are now irrigated from the Delta works, of which about 100,000 acres is new, as I have reason to believe, making about 500,000 acres in all, added to the area irrigated by the Cauvery Delta works. A great deal of land was not cultivated before, and it has only been cultivated in consequence of being irrigated. The difference between dry and wet assessment is, there, four rupees, so that the total revenue due to this would be 200,000 *l.* a year. But this does not all come into the Treasury, because some of it is zemindary land. The difference between

Chairman—continued.

Lieut. Gen. Sir *A. Cotton*, K.C.S.I.

20 June 1878.

the actual assessment in Tanjore alone of Government lands, 140,000 *l.*, is certainly all due to the works, and of course some party of the dry assessment of the same land. The capital expended in Tanjore alone is stated at 134,000 *l.*, and the net revenue due to the works at 116,000 *l.*, or 90 per cent. The total revenue of Tanjore was, before the works, 420,000 *l.*; it is now 750,000 *l.*, a difference of 330,000 *l.* All the assertions in the world will not get rid of these plain facts. This return of 90 per cent. is, besides, all the indirect returns from the general improved state of the district. It is quite certain that a large portion of the whole increase of 330,000 *l.* is due to the irrigation. The whole increase of the revenue of the Delta, including Trichinopoly and South Arcot land, is about 400,000 *l.* a year, the interest of 10 millions, which will give some idea of the effects of irrigation in mere money returns to the Treasury. The total irrigated area in the Delta is at least 1,100,000 acres. There were in the Delta before at most 500,000 acres very uncertainly irrigated; there are now 1,100,000 acres in a highly complete state of irrigation. The increase of produce due to irrigation is certainly 2 *l.* an acre, making a total of a million a year. What can be the object of trying to get rid of these plain facts? So with Godavery; the actual cost there has been 700,000 *l.*, and the increase of revenue of the district 350,000 *l.*, of which almost all is entirely due to irrigation and navigation. The Government Report for 1875 gives the nett return at 175,600 *l.*, or 25 per cent. The returns of 21, 15, and 87 per cent. mentioned in previous evidence is besides 4½ per cent. for Government interest. General Strachey some years ago, when he reported upon this, made the nett per-centage 28, and Mr. Thornton made it 40. I am quite sure he is nearest the mark; but what does it signify whether the return is 25, 28, or 40? This is not the question. The real and essential fact is that the works are returning enormous direct profits to Government, and by an increase of crop of 2 *l.* on 700,000 acres, at least 200 per cent. in crop alone, besides cheap carriage and all other benefits. The assertion that the old works were part of the new is also quite false; they form no part of the new works. I may give here the conclusion of Mr. Morris's official account of the district: "At one time the district was brought into a state of extreme impoverishment and distress. It was desolated by famine and misgoverned by the numerous landowners and their advisers. Since the introduction, however, of the admirable system of irrigation, it has brightened and revived; famine is unknown; the people are prosperous and contented; it is the garden of the great northern province; its revenue, instead of being reduced to the verge of bankruptcy, is more elastic than ever; its population has more than doubled; the material prosperity of its inhabitants is proved by their being better fed, better clothed, and better educated than formerly; its commerce has flourished, and its trade increased to a marvellous degree, and it may be confidently asserted that it is in as peaceful, happy, and prosperous a condition as any part of Her Imperial Majesty's dominions." I ask again what can be the object of trying in vain to get rid of these palpable facts. This district, from having been the very lowest, is now quite the highest in the whole 160 districts of

Lieut. Gen. Sir *A. Cotton*, K.C.S.I.

20 June 1878.

Chairman—continued.

India. Surely our wisdom is to be encouraged by this, and see what can be done to raise all the others in some degree, at least, to the same state of prosperity. Compare the report of this district with the following extracts on the state of Bengal. In the districts west of the Hooghly, Colonel Haig thus speaks of the state of things: "It would seem that the daily allowance per head is not more than a pound of rice, but in many years it may be much less than this. The present year's crop, for instance, is reckoned as only half a crop. If there is any truth in figures, we surely need nothing more to explain the frightful mortality which has accompanied the present epidemic. I can urge nothing more important than such a thorough investigation as would set these questions at rest, and furnish a satisfactory reply to the fundamental inquiry, What is the actual condition of the Hooghly peasantry? Are the high rents there in any wise an index of prosperity, or, on the contrary, of great and general poverty, of the state of things in which wealth accumulates and men decay? Is the population being gradually reduced, by a process of slow starvation, to a condition in which it must inevitably be swept away wholesale by indemic disease. I cannot myself but fear that such is, to a considerable extent, the case." If I had set myself to invent words that would place before the Committee a comparison of the highest and lowest state of the native population, how utterly I should have failed, in comparison of these terrible words. What has made the difference between these two tracts? In the one we had able, faithful governors and subordinate revenue men, who both laid a sound foundation in revenue organisation, and also called in the engineer to regulate the water; in the other the revenue foundation was utterly rotten, and the whole power of the authorities was exerted either to prevent the engineer attempting anything, or if they could not do that, at least to obstruct him at every step, and paralyse all his operations by preventing anything from being carried to completion. The expensive head works in Orissa executed, and then the distribution works stopped in the middle; the canals begun at both ends, and then the link to unite them, and allow them to effect anything refused, and so on. One of your previous witnesses stated that he "was perhaps a little afraid of once letting in one engineer and his schemes, for I did not know 'he said' where he would stop." He certainly had abundant cause to be afraid, for I do trust that if he had been called in he would never have stopped until he had done his utmost to sweep away this inconceivable blot on our escutcheon in India, and compel the official historian of the Hooghly district to give such an account as we have of Godavery. Colonel Haig goes on to tell of the desperate efforts made by the ryots here to secure by any amount of labour, every drop of water, utterly destroying the drainage of the country, &c., and how there is nothing possible for the case but a complete system of irrigation and drainage, &c. But, as I have said, no words of mine could show you as these reports do the terrible consequences of having administrators who are incapable of appreciating and making use of engineers; and I must again most earnestly entreat you to read these two sets of papers, Mr. Morris's account of Godavery, and Colonel Haig's and Mr. Saunders' account of Bengal, and then judge whether administrators who dread engineers as the greatest evil districts can suffer under, far beyond famine, slow starvation, and fever, leave the best results behind them, or those who account them after wise revenue organisation the next great essential for the cure of the evils of India, but I must go on to the remaining mistakes that have been made in the previous evidence. The next point is tanks. The truth about these works is that they are invaluable in 19 years out of 20, or more, but that they have a serious defect, namely, that they are not supplied from the great rivers, in consequence of which they almost all failed in the late famine; but this is one of our failures. We have neither put these works, with some important exceptions, in a thoroughly effective state of repair, nor have we used our immensely superior power to supply them where possible from the great rivers, while a great number of them can be so supplied; and this is undoubtedly one of the most essential works that the Government can undertake immediately; namely, the thorough repair, enlargement, and improved supply of these grand works. Many thousand of them can be supplied from the rivers rising in the Western Ghats at a practicable cost. They are situated at every level from near the summit of the country near Bangalore, 3,000 feet above the sea, and in every kind of situation, in the plains and the hills. Many of them are most noble works, from 60 feet deep downwards, and containing from 100,000,000 cubic yards. There were certainly great men in India in those days in high places; not like boys with guns which they are afraid to let off, but men who could handle an engineer without fear and could revel in cold water. Next, with regard to the proposed lines of canals; I really thought there was nobody who had been many years in India who did not know where ranges of mountains were, and where they were not. It has been stated in the evidence that there is a range between the east and the west coasts on the line of the Godavery and Taptee: there is no such thing. The watershed between the Poornah and the Wurda is without the sign of a hill, and it is just the same level as the line between the Sutlej and the Jumna, on which the canal is nearly completed. There is not a single serious natural obstacle from sea to sea. An expenditure of 700,000 *l.* has very nearly completed the opening of the first 300 miles by the Godavery. The improvement of the Wurda has been carefully estimated by Colonel Haig at 2,000 *l.* a mile, and the remaining 400 miles could probably be executed at 3,000 *l.* a mile, but it has not been estimated; if it cost treble that, 9,000 *l.*, it would be only what has been paid for the utterly insignificant coal railways just made in that part of the country, and which are not a hundredth of the importance of this grand connection of the two coasts, opening up the hitherto paralysed Central Provinces to all the stimulating influences of foreign trade. How any Commissioners could have gone on for years there, content to see their province shut out from the world, and kept in such a state of poverty is to me most astonishing. It costs now 2 *s.* 0½ *d.* a ton per mile to convey the cotton by the railway, increasing the cost when it has reached the coast by a halfpenny a pound. Think also of the ships and the country being deprived of the inexhaustible supply of coal

Chairman—continued.

coal of the Wurda coalfield for the want of this communication. What is the use of all the treasures of India in the hands of men who are incapable of opening the way for their distribution. Think of the country being driven to the necessity of destroying all its manure for want of fuel, when there is an unlimited supply, but all useless for want of cheap carriage. Madras, Coconada, and Surat ought all to be coaling ports at this moment, and millions of tons of manure ought to be supplied to the land instead of being burnt. Think of 500,000 *l.* being spent on 60 miles of petty branch railways, where they are shut up for six months in the year, because there is nothing to carry, and on which there is not the least prospect of their paying interest, costing 9,000 *l.* a mile, while the first part of the water line has been opened for 2,000 *l.* a mile, and probably the whole 900 miles of river and canal connected with this line could be completed, including what has been spent, for 3,000,000 *l.*, or at 3,000 *l.* a mile, and who can estimate the effect of this upon the whole of Central India, giving immense value to all its treasures of coal, timber, oil-seeds, wheat, cotton, &c., and supplying it in return with salt, rice, and all sorts of foreign imports. I will venture to say that hardly any country ever underwent such a change from poverty and inanition as these provinces would undergo if they were thus thrown open to the world. Are we really never to see again in India men who are capable of comprehending such simple things as these? Six per cent. on that sum would be 180,000 *l.* a year, equivalent to a tax of 4 *d.* a head per annum on 10,000,000 of people who would be affected by them. There can hardly be a doubt that the increase of salt revenue alone in these tracts would pay the whole interest and expenditure of this line. And so with the line from Madras to Carwar; there are no mountains in the line. There is certainly there a greater ascent, about 2,000 feet, but this is no essential obstacle. The Madras canal has locked 450 feet of this already. Again, the west coast; it has been asserted in the evidence that there are mountains on this line. How unaccountable that such assertions should be made. There is no such thing. There are one or two slight cuttings required, the worst of which has already been executed by the petty native state of Travancore; another portion of this line has been enlarged by the State of Cochin. The whole work is a perfectly insignificant thing from Carwar to Cape Comorin. Is it too much to demand of the Committee to suppose that one who has professional knowledge and has seen the line knows more about it than one who is not an engineer and has never seen it, who does not even take the trouble to look at the map to see where there are mountains and where there are not. The little State of Travancore, with a revenue of half a million, has spent 100,000 *l.* a year on this canal and other public works. I do wish we would condescend to learn a lesson from our native friends, or borrow some black Commissioners from them for our own provinces, and see if we could stir up our governors to do for our vast provinces what they are doing with a thousandth part of our means. Then about the Orissa works. These works have cost one and a half millions, and have been stopped in the middle. And the canal to connect Cuttack and the Upper Mahanaddy with Calcutta has been

Chairman—continued.

left with 80 miles in the middle uncut. The vast headworks of the irrigation which give command over a vast tract of country are now charged to quite a small tract, and the canal extends to 60 miles from Calcutta and then stops in the middle of the delta, at nothing; and then the engineer is charged with the failure of the works. Suppose the railways had been dealt with in this way, the great station at Calcutta built, and the road carried 100 miles, and another executed out of Benares, and then the works stopped, what would be the result? Is it not incomprehensible that such imbecility should be shown? In this way the cost per acre on irrigation may be increased indefinitely, and the traffic on the little bits of canal cut reduced to a tenth. What can stand before such a system? It is quite certain that if this communication with Calcutta had been completed it would have clenched the matter in respect of the irrigation, and would have enormously increased the value of every acre of land in the whole delta. Even this bit of canal, ending at nothing, has paid last year 3½ per cent. in spite of the most absurd charge of three-farthings a ton on the goods carried per mile. What would be the traffic on this canal if it opened the whole valley of the Mahanuddy to the immense market of Calcutta, and the charge per ton were one-twentieth of what it is? As it is, the traffic is 150,000 tons already, three-quarters of that on the great railway thoroughfares of India. The same with the Godavery navigation. It has taken 25 years to get 700,000 *l.* for this work, 30,000 *l.* a year, till the value of labour has increased threefold, and the works have been again and again stopped entirely without notice, and at last put an end to just as they were being completed to a point where they would have opened up an immense tract of populous country; and then the perpetrators of such atrocities say, What men these engineers are! It is now certain that if the first sum of 300,000 *l.* roughly guessed before an estimate was made had been granted in three or four years, this 400 miles would have been completed 20 years ago, and before this the cost would have been recovered twenty times over by the incalculable benefit it would have conferred on many millions of people. The works are all but completed and have cost 2,000 *l.* a mile against 20,000 *l.* for railways, and 9,000 *l.* for the petty railways in that part of the country. Think of 500,000 *l.* being expended on 60 miles of railway, while money could not be found to complete this 400 miles of main communication. Again, it is stated that the river is only open for four months. I passed down it at Christmas from the second barrier near the end of seven months, and some years it is open much longer.

Lieut. Gen. Sir *A. Cotton*, K.C.S.I.

20 June 1878.

Sir *George Campbell.*

2209. In what kind of vessel did you pass down?—In a small boat, not a large goods boat; we are working steamers now on 18 inches of water.

2210. Was this a boat which drew as much as 18 inches?—Quite 18 inches; quite a practicable cost would store water enough to keep this river open all the year with this additional benefit, that the cost of the water would be paid for over and over again by its use in the Delta, after finishing its duty of carrying. Now compare these proceedings with those in the case of rail-

Lieut. Gen. Sir *A. Cotton*, K.C.S.I.

20 June 1878.

Sir *George Campbell*—continued.

ways; while they cost ten times what this waterway has cost, can only carry very limited quantities utterly inadequate to the demands of the country and at ruinous charges, any number of millions could be found without a word of discussion as to where the money was to come from. Again, one of the witnesses talked about anicuts being swept away; he did not know that an anicut could not be swept away; again, he speaks of well-irrigation, and says nothing about the difference between either its cost or its quality as compared with the river or tank water. Do these things make no difference: can we decide between well-irrigation and river, without knowing whether one is five times as valuable as the other or not, and whether one costs 20 times as much as the other or not. Well-water contains no nourishment for plants; river water completely renews the land without any manure, and the comparative cost is thus shown: well-water costs 1 *l.* for 3,000 cubic yards. The new tanks in Bombay will cost about 1 *l.* for 12,000; the Ganges Canal the same; the Toongabuddra Canal, 15,000; the Godavery, 120,000, and the Tanjore works still less. When anyone asks, Why execute such great works; the answer is, Because we get this invaluable river water at a fifth or a fiftieth of the cost of well-water, and manure the land into the bargain. I trust that these answers to the principal objections and mistakes of the previous witnesses will be sufficient to give some idea of the extraordinary fancies that men will gravely bring forward about matters that are out of their line. It does seem very extraordinary that it should not occur to them that they have no knowledge of the things. A letter was lately published in the "Times" by a lawyer, every sentence of which showed that he knew no more about irrigation and transit than I do about law. I must say that gentlemen on this Committee can hardly but be staggered by such assertions as that there are mountains in such a place where there were none, and such things, when there were no such there, because they would naturally suppose that, whether an engineer or not, he could look at a map. I beg, before I conclude, to urge upon the Committee what I consider quite the most important point in this whole inquiry, and really the fundamental point. It is the transit question as illustrated by the Goalundo Canal. I have taken the liberty of sending the honourable Members copies of Mr. Leslie's letter on this matter. He says that he estimates that if the canal coasts 15,000 *l.* a mile it would yield 11 per cent. nett, and save 840 *l.* a year on the Eastern traffic alone, which would be doubled by the Western traffic; a total saving of more than 2,000,000 *l.* a year on a single line of 130 miles, on which there is already a railway and a river communication, and that on the present traffic only, besides the great traffic it would create. He says, "The fact that the railway company has been in the field 12 or 13 years and has literally acquired only a tithe of the traffic, is an unanswerable argument in favour of the canal." Now it is 20 years since I was ordered to report upon this line, when I suggested a canal. Allowing Mr. Leslie's estimate, we cannot conclude that, including the new traffic, less than 50,000,000 *l.* have been lost in that line during the 20 years. What has been the loss on all the main lines of India alone for want of similar cheap carriage, all the 30 years that the railways

Sir *George Campbell*—continued.

have been under construction, and what is the annual loss at this moment over all India from the same want? I am certain that, if this letter is fairly considered, and the unquestionable deductions to be made from it, the only possible conclusion is that an annual loss is thus sustained equal to several times the amount of the present taxation. The Committee will perceive from what I have said that, in my opinion, it is impossible that a more complete perversion of the whole subject of public works could have been brought forward than the view taken by a previous witness. How could a question of greater importance be offered for decision by the Committee than this, which of these two views is the right one. The question is nothing less than whether Godavery, as described by Mr. Morris, or Bengal, as described by Colonel Haig and Mr. Saunders, is henceforth to be the standard by which all the rest of India is to be regulated. It is certain that not only the well being of India, but to a great extent that of the whole Empire, is hanging in an essential degree upon the decision to which the Committee may come. If the standard of Godavery is attained, the revenue will be increased two-and-a-half fold, the exports 15 fold, the imports 10 fold, the traffic on main lines 20 fold, and the population placed "in as peaceful, prosperous, and happy condition as any portion of Her Imperial Majesty's dominions." If Bengal is to be the standard, we must answer these questions of Colonel Haig's, "Are the high rents there in any wise an index of prosperity, or on the contrary, of great and general poverty, of the state of things in which wealth accumulates and men decay? Is the population being reduced by a process of slow starvation to a condition in which it must inevitably be swept away wholesale by indemic disease?" adding, "I cannot myself but fear that such is to a considerable extent the case." The sole cause of the difference between the two standards is undoubtedly that, in one case, there were rulers capable of organising a wise and just system of revenue management, and of making use of engineers and water, and in the other there were not. The nature of the two tracts was exactly the same, rich delta lands. I must beg to add one or two remarks; first, what are we to think of evidence in which interest and compound interest are insisted on, and most justly, in calculating the loss on the Ganges Canal, but on the other hand not a word is said either on the accumulated interest in the vast profits on the Tanjore, Kistna, and Godavery works, nor on the enormous accumulations to loss on the railways, now amounting to 50,000,000 *l.*, besides the cost of land, making, with the State railways, a total of sunk money of 170,000,000 *l.*, with a clear annual loss to the Treasury of 3,000,000 *l.* a year? And again, of the moderate fever on some portions of the irrigated lands, while not a word is said of millions of acres of irrigated land in various parts where the population are as healthy as anywhere in the world; and, on the other hand, while there is the most virulent and fatal fever by far that has ever been heard of in India, raging for years for want of irrigation works, under the eye of the Governor of Bengal? Again, what is to be said of the mention of a difference of opinion between two engineers as to the probable cost of the Goalundo Canal; but not a word about the chief railway engineer pointing out

that

Sir *George Campbell*—continued.

that on the highest estimate there would be a clear saving of 2,000,000 *l.* a year on 130 miles, by the side of a railway which, after 12 years' trial, left nine-tenths of the goods to go 300 miles round by a bad river navigation, which takes six weeks, and this also under the immediate eye of the Governor? Again, what is to be said of the assertion, without a word or a figure in support of it, that the returns were less than 87 per cent. in Tanjore; but not a word about the wonderful prosperity of the three irrigated districts, and the enormous additions that had been made to the revenue there? Again, of the grain that had been carried by the railways for the famine; but not a word of the millions that utterly incompetent means had left to die; nor of the perfect freedom that the irrigated districts had enjoyed in the midst of all this dreadful calamity? Again, of the assertion that canals could not be carried across the watersheds of the Poornah and Wurda, of the Kalanuddee, and Toombudra, and on the western coast, on account of mountains, when no such mountains exist? Who cannot see that such evidence has been given under the influence of some fatal bias, that takes away all confidence in the whole of it? My further remark is, that the enormous returns of the Godavery works is in spite of every effort to prevent their being completed. It has taken 32 years to obtain 700,000 *l.* for them; 20,000 *l.* a year for works which from the very first have been a most prodigious success, and nothing would induce the authorities to carry them on with ordinary vigour. To this day money cannot be found to complete them, while the only dispute is whether they yield 17, 28, or 40 per cent.; and now, after 32 years, only 700,000 acres out of 1,000,000 are irrigated. If 100,000 *l.* a year had been granted for five years, the whole delta would have been irrigated 27 years ago, before the great rise in the cost of labour, and the district would have been yielding a revenue of about 750,000 *l.* a year for the last 27 years, making an addition of many millions in the Treasury beyond what they have returned. During this time there was not, for instance, the least question about supplying 500,000 *l.* for the 60 miles of railway in Nagpore, which, it was acknowledged, would not pay 4 per cent. Who can be surprised that the finances of India are out of order when such terrible perversions of the funds at our disposal are allowed. And with respect to the Ganges Canal, the sole cause why that work has not been abundantly remunerative from 30 years ago is the mistake in the projection, going up into the hills for the source, when there was no necessity for it. But for the time, and a million of money expended upon this, if the work had been led from below the hills, as the Lower Ganges is now, the canal would have returned high interest 25 years ago. If properly considered, these and other mistakes, instead of being discouragements, are the greatest possible encouragement. We may fairly hope that they will not be repeated. Another remark is on the carrying out of Mr. Leslie's canal, *in extenso*, up the valley of the Ganges. One of the witnesses has already spoken of this line of canal. The Sirhind Canal brings the communication to near the Ganges. He says that "the Sirhind Canal, with the western Jumna and Agra, will complete a line to below Delhi, and so make a through communication with the seaboard, and the links that

Sir *George Campbell*—continued.

Lieut. Gen. Sir *A. Cotton*, K.C.S.I.

20 June 1878.

are required are comparatively small in number." A short link will connect the Lower Ganges Canal with the Soane canals, which will extend to Monghyr on the Ganges, from which a link of 70 miles would carry it to the proposed site of the Rajmahal Canal, which was to extend to Calcutta, the work of which one witness expressed great terror, but which I trust we shall yet see men of sufficient energy and capacity to carry it out. And with respect to the traffic on the Ganges Canal, I have not been able to get the returns of this for several years, but some years ago it was, I believe, about 100,000 tons a year. When I inspected it there were six essential defects in the navigation, one of them being that the bridges would not admit of loaded boats passing under them. This has now been remedied, but whether any of the others have or not, I do not know; but this I know, that everything was done that could be to discourage the use of the canal. When I was at Cawnpore boats were not allowed to pass through the locks into the Ganges, though there they were in perfect order. If the remedies in the navigation were completed, and the influence of Government were not exerted to prevent the canal being used, it would be one of the lines of greatest traffic in the world. The plain fact is that the dread of the officials is cheap transit; the whole power of the Government with its treasury is to force the people to carry dearly a small quantity by the railways, rather than allow an enormous traffic to grow up at an almost nominal cost by the canals. This was what stopped the Damoodah Canal from the coal-fields to Calcutta, the completion of the Orissa canals, the Godavery navigation, &c. The newspapers have been full of notices of the utter failure of the railways to carry the trifling traffic that has offered. A gentleman connected with the Indian trade was telling me lately of the ruin caused by thousands of tons lying rotting at the stations, while the ships in multitudes were lying idle at the ports for want of it. Why not acknowledge at once that a most terrible mistake has been made, give India at once its ample and cheap water carriage, and trust to the prodigious enrichment of the country by the additional value given to all produce by that means, for the increased use of the railways. A late governor of Bengal was so afraid of this cheap carriage that he stopped the execution of the Western Main Canal from the Soane, though it was an essential part of the irrigation, to prevent its being used as a communication with the Ganges. The Viceroy overruled this, and it was ordered to be continued. The officer in charge, knowing what efforts would still be made to stop it, placed men on the whole length of it at once, but before it was finished orders came from home to stop it, and it is left in an unfinished state to this day. It is absolutely necessary that the Committee should know those things, that they may understand what cheap transit has to contend with. But thus it is; in addition to the railways costing the country 3,000,000 *l.* a-year for interest of debt, &c., above what they yield, they are at this moment the one obstacle to India being supplied with the very first requisite of all material progress, cheap and sufficient traffic. There is no possible answer to Mr. Leslie's Paper. It puts in an indisputable light the whole question of material improvement. In

Lieut. Gen. Sir *A. Cotton*, K.C.S.I.

20 June 1878.

Sir *George Campbell*—continued.

Canada we have set an example of cheap transit, which the States now see that they must follow or be beaten, and they are planning a vast system of water transit. France is making a water line from Havre to Marseilles at a cost of eight millions sterling, to carry vessels of 350 tons by the side of a railway that has been tried for 40 years, because the railway cannot carry the quantity or at the charge that is essential. Why should not we take warning at once before India loses another hundred or two of millions, and set about to give her this inestimable boon? We know now that railways cannot carry the quantities required nor cheaply, that they cannot prevent millions dying of famine, &c. What strange obstinacy it will be if we still persist in this ruinous course with our eyes open.

Chairman.

2211. You would like, would you not, to add some general conclusions?—Yes; first, the very first work is to connect the present patches of navigation with each other. It is impossible to estimate the return that these works will make. Links of 50 or 100 miles will give effect to hundreds of miles now in operation, but comparatively useless from their being isolated; for instance, the Ganges valley line; that of the Orissa delta; the Toombudra and Madras line; the Upper Godavery and Madras line; the west coast, where the petty native states have shamed us by cutting their part, while we have not had enough energy to do ours. For instance, the 50 miles from Allahabad to the Soane canals, would open the line from Loodiana to the Lower Ganges; 80 miles in Cattach would increase the value of every acre in the vast delta of the Mahanuddee, and so on. I am certain no money could now be laid out in India that would produce such great results as this. The second work is to restore and supply the old tanks. The third is to carry out the main lines of navigation. The fourth is to execute irrigation works in every district of India, not omitting one according to its peculiar circumstances. I am quite certain that if these works are energetically carried out by men heartily forwarding them, not by men secretly endeavouring to their utmost to prevent their producing their legitimate effects, they will not only almost completely prevent famine, but add hundreds of millions per annum, I speak advisedly when I say hundreds of millions, to the value of Indian produce. The annual produce of Godavery has certainly been increased by more than two millions a year, and it is only one of 150 districts, and it is still isolated and not in effective communication with all the rest of India. I grant that the upland tracts will cost more to irrigate and open than Godavery, and therefore that the return will not be 200 per cent. in them, but this is not necessary. But the links of canal will probably quite equal this. Mr. Leslie shows that two millions spent on his link will return 100 per cent. by the present traffic, saving two millions by the expenditure of two millions, but how much more will it yield when it forms part of an effective communication to Loodiana. Nobody who has not really looked into this matter can form any idea of the wonderful results to which this transit question brings us. If a link of 50 miles leads to the carriage of a million tons over 500 miles, with a saving of only a penny a ton, it will save two millions a year, the link costing

Chairman—continued.

200,000 *l.* If it is asked, but do you expect that the irrigation works will pay their interest? I answer first, that I am perfectly certain that they will do so in spite of all efforts to prevent it, although of course the means adopted with respect to the Orissa works may be so far successful as greatly to delay results. Certainly if works are dawdled over for 20 or 30 years, and then stopped before they are half finished, and if the management of them is so wretched that things are allowed that prevent men from taking what they are most intensely anxious to get, there may be any amount of waste; but I have that confidence in water that I am sure it will ultimately overcome all obstacles. And besides we are not to suppose that India is never again to have men who will know how to get over petty difficulties, and be really anxious to do so, instead of trying to make them. If the Orissa works are carried out to a moderate extent they will not certainly cost more than 3 *l.* an acre, and 2½ rupees water rate will then be 8 per cent. gross, or 5 per cent. net. This is besides tolls. If the present canal ending at nothing, carries 150,000 tons, when the whole delta is placed within reach of Calcutta, the traffic cannot be less than 500,000 tons, on which a farthing toll per ton for 250 miles would be 125,000 *l.*, which alone would be 4 per cent. on three millions, watering a million acres. I am quite certain if this were done under a fairly able governor of Bengal we should soon have a report of Orissa very similar to that of Godavery, and so with the Hooghly districts too. Only think of seeing the Province of Bengal raised out of its present terrible state of poverty, degradation, fever, and hopelessness, and it could be reported of it that it was in as peaceful, contented and prosperous a state as any part of Her Imperial Majesty's dominions. What India wants I am fully persuaded is, that at least 3 lacs should be spent in every district on an average per annum on irrigation, besides carrying out a complete system of navigation to the same extent of expenditure; together, 10 millions a year; and I am sure if this were heartily and ably done we should see such a revolution as hardly any country ever underwent. If report speaks truly, two of the provinces of India are already under a more vigorous system of irrigation management, and I trust that the two present Committees will lead to the turning over a new leaf. I have a good hope that as soon as England has got over the present political crisis, it will take up the matter of India, and no longer suffer famines to be trifled with, and millions left to perish for want of carrying out a perfectly well-known and proved remedy. Perhaps I may be allowed to read an extract from a letter which I got this morning from Godavery: "I wish you could see the noble and yearly increasing results of the works in this Delta." And from an Indian paper received to-day: "No one in Allahabad, not even the Natives, have any idea that as near as Cawnpore hundreds were dying daily from starvation." This is the last news from India. "The constraint which" the writer of this letter from Bareilly "has put upon himself," is manifest in every line of it, and yet how terrible it is. Travelling in February, "I saw" he says, "men lying dead by the wayside; others abandoned to perish; scores were tumbled into old wells, the deaths being too numerous for the miserable

relatives

Chairman—continued.

relatives to perform the usual funeral rites. Scores of children were emaciated to the last degree. Here was a family of little children, both parents dead; there a widow with three small children; more than one hundred had perished already in this, not large, village. I applied to the magistrate, and the prompt reply was, that there could be no departure from the established mode of relief." That is in "The Friend of India," of the 28th of May, and refers to the state of things in the North West, Oudh, and Rohilcund at this moment.

2212. Does that conclude the statement which you wish to put in before the Committee?—Not quite. My second answer to these questions is, what I especially insist upon, that we must not let this secondary point, material as it is, hide from us the great primary one. We have abundant proof that we can go on watering India at a cost of 2 *l.* 10 *s.* an acre, and we have certain proof that irrigation will increase produce by from 1 *l.* to 2 *l.* an acre, which is from 40 to 80 per cent., an average of 60, and we are also assured by actual results that the remaining pecuniary benefits from cheap transit for any quantities to every man's door, draining the land, &c., are far beyond another 40 per cent.; so that an average of 100 per cent. in money returns is abundantly proved by actual results on a vast scale; and all this is besides the first point of all, which is security from famine, instead of the millions which the railways have left to perish wherever they have been tried; every day the accounts are more and more terrible of the loss of life in districts in which this miserable expedient has been tried at the rate of a million pounds per district. But we know these things, that a steamboat canal can be made cheaper than a railway; that it can carry cheaper; that it can carry all that is wanted, and that a railway cannot; and that it can carry at ample speed for every purpose; that in case of disturbance it is incomparably more defensible; and that it can be, in most cases, combined with irrigation and drainage; and the supply of good wholesome drinking water will always accompany it. I ask then, what is the reason for persisting in railways; we are rational beings; do let us have some reasons for what we are doing. The adversaries of irrigation cannot show one thing in which railways will have the advantage over steamboat canals in India, and the chief railway engineer insists upon the necessity of cutting a canal by the side of a railway that has been tried for 12 years, and gives plain figures that nobody can set aside. This is a great question; it is impossible to overestimate the terrible responsibility that rests on this Committee. Their decision cannot but affect most seriously a rapidly increasing population now amounting to 240,000,000; and not only so, but also the character and well-being of this whole vast empire, for our own well-being is now inseparably connected with that of India. I must myself do my utmost to help them to come to a sound judgment, and I do not see how I can do that without some reference to myself. I never made this a personal matter, and I trust I am not going to begin in my old age. I never asked for an appointment, or for any thing else, except to be allowed to irrigate India. I never possessed property, nor ever took a share in any speculation, that I might have nothing to occupy my thoughts or warp my judgment, but might

Chairman—continued.

Lieut. Gen. Sir *A. Cotton*, K.C.S.I.

20 June 1878.

give myself up to my duty of helping to raise India in this particular point. It has pleased God so to prosper the works that I have been engaged in, that the dispute among my adversaries is whether returns are 17, 28, or 40 per cent., and in another, whether the return is not less than 87 per cent. Now may it not help the Committee to understand this question, if they will consider what must be the weakness of that side in a cause, when the opponent is held up in a place where he could not answer for himself, as the wildest and rashest of engineers, and before this Committee, after 57 years' acquaintance with the business, after having had a hand in irrigating millions of acres, and cutting thousands of miles of canals, as a man who was so profoundly ignorant of his profession that he did not know where a canal could be cut, and where it could not, nor even after having traversed almost all India, with one thing in view, did not know where there were mountains, and where there were not. In setting about to judge between myself and my opponents, or rather between the views of myself and those of my opponents, may it not justly be considered whether a man who has certainly been the most successful and has had by far the longest experience, knows something about what he is talking about; and then cannot wise men judge of the plain facts and figures which he has set before them in this evidence. How is it possible to get rid of these facts? Are Tanjore, Kistna, and Godavery, at this moment strewed with hundreds of thousands of the skeletons of victims of famine? Are the districts of Bengal and Madras on which millions have been spent on railways, rolling in health and wealth and plenty, in freedom from fever and death? Has the revenue of Bengal, have the revenues of the railway districts of Madras being raised by an addition of 150 per cent? Did any railway ever raise a crop of human food worth a million of money in the midst of the famine as the Madras Company's Irrigation Works did, saving Government 500,000 *l.* in their famine expenditure? Can any sophistry in the world or any contempt of one who brings forward these facts, get rid of the facts themselves. Supposing these facts were brought forward by a man who after 57 years' practical experience did not know how to cut a canal, or where one could be cut, how would that alter the matter?

2213. You have placed before the Committee very clearly your views, and you have stated that, speaking generally, you are in favour of a very large expenditure annually upon irrigation and navigation, and you propose that a sum of 10,000,000 *l.* per annum should be appropriated to that purpose, and with reference to your estimate, we should gain on the expenditure?—I feel perfectly satisfied that it would return to the Government the interest of the money; of that I have not the smallest doubt. Of course each individual case will have to be considered and ascertained. May I just add one word to that; we are in this peculiar position now with respect to communications that we have got thousands of miles of effective navigation isolated, and not doing one-tenth part of the work that they would do, but for the want of a little bit to connect them. We are in this position that 50 miles here and 80 miles there, and 100 miles in another place, would give effect to thousands of

Lieut. Gen. Sir *A. Cotton*, K.C.S.I.

20 June 1878.

Chairman—continued.

miles of navigation, and in that way capital so expended must of necessity produce such immense advantages.

2214. You have given us very full and interesting information concerning the returns of certain works in the delta of Madras, namely, in the delta of the Cauvery, Khistna, and the Godavery; I will assume for the moment that all your figures in connection with these works are correct; what other irrigation works in India, which have been constructed during the last 20 years by the Indian Government, now pay, excluding those in these three deltas?—None of the great works pay yet.

2215. Therefore, is it not pretty clear that a great success may have been attained in a certain part of India, that is in the delta of Madras, but that a similar success has not yet been attained by the works in other parts of India?—I have given the reasons for several of those.

2216. Therefore it would not be safe, from your experience, or the experience of anyone *else in these* three particular districts, to generalise for the whole of India?—No; I only take encouragement from them; each individual scheme must be examined on its own grounds, of course.

2217. We have had very able and clear evidence from the officers of the Public Works Department; I do not know if you have looked through the papers which they have handed in, and whether you have seen the forecast of expenditure?—Yes, I saw that forecast.

2218. Did you there notice that the Public Works officers, whose business it is to push on irrigation as much as they can, estimate that although year by year an additional sum of say a million or more is to be applied to irrigation, yet year by year the return is worse?—I do not know how they make that out.

2219. But it is a fact that in that estimate they do allow for a worse return some four or five years hence than what they estimate now?—I am aware of that.

2220. If by a moderate expenditure of one million per annum, we are five years hence to have a worse return than we have now, it is quite clear, is it not, that if we spend 10 millions as you propose, we should have 10 times as bad a return?—I am quite certain that that is not a correct view of the case.

2221. Then you must utterly dispute the figures of the estimate of the Public Works officers?—I give figures here of the general results, and the probable cost of works from the actual cost of works that have been executed, and that you can irrigate at 2 *l.* 10 *s.* an acre; there is no dispute about it, nor can there be any, and that two and a half rupees an acre, that is 5 *s.* on 2 *l.* 10 *s.*, is 10 per cent.; there can be no dispute about that.

2222. But your figures I think you derive from your experience in Madras?—From the whole cost of the works all over India.

2223. That is by lumping them all together you make the profit on the works that do pay go to compensate the loss on those that do not?—No; I am speaking now on the conclusions which we draw from what they have cost. The estimate now for the Soane work is 2 *l.* 10 *s.* an acre, the ultimate cost of getting the water, and two and-a-half rupees water rate would be 10 per cent.

Chairman—continued.

2224. But they have not realised that; that is what they hope to get?—There is no reason why they should not. They watered 270,000 acres this year by the Soane, and there is no reason why they should not at all.

2225. Still, as you admitted in your first answer, with the exception of the works in the deltas of Madras, there is scarcely a large irrigation work which has been carried out by the Government during the last 20 years which does pay?—No, not at present.

2226. Therefore, although it may ultimately pay, yet at present our experience is, that the sanguine anticipations concerning irrigation have not been realised?—Yes; neither have you got any returns from the Godavery navigation; a work estimated 25 years ago is put off, stopped, gone on with, stopped again, and gone on with again for 25 years, until the value of money has altered threefold, and then just at the last moment when it is entering the populous country, it is put a stop to altogether, and you say that the engineer is at fault, that his estimates have failed, and his works have failed, and of course what can stand against that.

2227. Take that particular work, do you know why it was stopped?—I am sure I do not know why, except that I know that it was a sort of antagonistic work to the railways.

2228. The reason of it was that an elaborate Report was made on it, and the First Commissioner of the Central Provinces, Mr. Morris, and several other persons, expressed their opinion that that work never could pay, and the Indian Government, at the time when, I think, General Strachey was the head of the department, sent home a despatch, which concludes in the following words, "The project has already swallowed up 700,000 *l.* with no practical result, in obtaining a thorough communication. The work cannot be utilized in any sensible degree until a total outlay of at least 900,000 *l.*, has been incurred, and cannot be made complete for navigation under a total outlay of 1,200,000 *l.* The history of this project should, we think, be a caution to every future Government of India not to take up engineering projects, until complete designs for the works and estimates of their cost have been carefully worked out." That was the ground for refusing to go on with the work?—What conceivable object could there be not to make that work for 3,000 *l.* a mile, by their own statement, 400 miles for 1,200,000 *l.*, when they had got branch railways in that very district at 9,000 *l.* per mile, three times the cost. This thing cannot be answered. They most solemnly and seriously object to spend 3,000 *l.* a mile on a grand main line of communications of 400 miles, at the very time that they are spending 9,000 *l.* a mile in little branch railways merely to carry the coal on that very spot.

2229. Do you not think that they probably spent the money on railroads because they thought they would get some advantage from the expenditure, and that they did not do so on the Godavery, because there seemed to be no prospect of their getting any return?—There was an absolute certainty that the Godavery works would be used to a great extent; there was no possible room for doubting it.

2230. Did you never hear the fear expressed that during four months in the year there would not be sufficient water for navigation?—Yes.

2231. And

Chairman—continued.

2231. And those are the four months during which the traffic would be most anxious to utilize the canal?—My answer to that I have given already; that if you wanted to complete the navigation for the whole year, you could do that at a very moderate expense by storing the water.

2232. That is an expense additional to completing the canal, and not included in the 150,000 *l.*?—That is for making it for the whole year.

2233. Although to you the Indian Government may seem to be very unreasonable, it is possible, is it not, that they may have had good grounds for not going on?—But they had no grounds whatever; that is what I insist upon, and am prepared to prove; that it could not be right to spend 9,000 *l.* a mile just upon little branch railways, when you would not spend 3,000 *l.* a mile for water. Nobody can answer that.

2234. What was the railroad upon which they spent this money?—Those three railways in Nagpore; the two branch railways in Berar, and one in Nagpore itself, down to the railway, they are spending 500,000 *l.* on 60 miles of railway.

2235. That money was spent, was it not, in order to get to the colliery?—Then why may not I say that the opening of the Godavery was to carry that very Wurda coal down to the port, and make Coconada a coaling port?

2236. But unfortunately the canal would not have been navigable at the very time that it would have been wanted?—In the first place you are not obliged to carry coal at any particular time; it is quite a mistake to suppose that a line of transit is of no value that is not open for the whole year round. The Erie canal is only open seven months in the year, and it is the great artery of the United States.

2237. Supposing that the coal had been carried from Warora to Coconada, who would have wanted it?—Coconada would have become immediately a coaling port, and ships would have called in there on their way to Calcutta and back to take in coal.

2238. But coal was wanted west, was it not, and not east?—It was wanted in both places; in Madras it is continually wanted; Coconada and Madras would both have become coaling ports.

2239. But the connection of the railway with this particular colliery, enables the coal, does it not, to be taken both to Bombay and to Madras?—No, it makes it perfectly impossible, because it is at an impracticable cost.

2240. There is a very large coalfield near Calcutta at Raneegunge, is there not?—Yes.

2241. Is it not more likely that if Madras wanted coal, the coal would come from there than from this inland colliery?—They could not bring it as cheaply.

2242. Why not?—Because the inland canal and river navigation would be cheaper than bringing it from the port of Calcutta, having to go out to sea; and owing to the enormous demands of inland short distance transit, compared with the sea transit.

2243. Why would it be cheaper?—The inland service is so exceedingly cheap, as I have stated.

2244. That is to say, if you charge no tolls on the canal?—You may charge what tolls are necessary, but I am including tolls, if you chose, to charge them.

2245. Surely the cost of transit would depend entirely upon what you charged?—Of course.

2246. And the amount to be charged would, I suppose, depend very much upon the cost of the canal?—Yes.

2247. Therefore it comes to this, that unless the canal can be made for the figures that you estimate, the cost of transit would be greater than what you contemplate?—I take the figures which you yourself have given me, upon which the cost of the navigation of the Godavery is 3,000 *l.* a mile.

2248. But you arrive at those figures by taking the total length of the river which becomes navigable, and you put that total length against the cost of the two or three canals which are made to get round the impediments in the Godavery?—I take the whole line, and it comes to 3,000 *l.* per mile, according to that estimate.

2249. That is, you can make the river navigable for a certain distance for 3,000 *l.* a mile; but it does not follow that you could construct a navigable canal for 3,000 *l.* a mile?—I am not speaking about the canal now. We are talking about the navigation of the Godavery. As respects the cost of the canal when it gets down the Rajāhmandry, the next 90 miles of canal has cost 1,000 *l.* per mile.

2250. In your evidence you stated that the canals had been constructed at a cost of from, as I understand, 1,000 *l.* to 6,000 *l.* a mile?—Yes; those are the extremes. Some canals have cost less than 1,000 *l.* a mile; but I am speaking of a large canal.

2251. That is a canal which is navigable?—Yes.

2252. What canals have been made at that cost?—The Kistna and the Godavery canal of 90 miles cost 1,000 *l.* a mile, right across the lay of the country.

2253. Excluding those canals made in the delta, what other canals have been constructed?—This is not in the delta. It is out of the delta. It is across the lay of the country, in the upper country from Rajahmundry on the Godavery to Bezoarah on the Kistna.

2254. Can you give any other instances of canals which are navigable?—I have not heard yet of any that have been opened. They have cut a canal from Madras to the north, I believe, now, to Nelloor. I saw a private letter saying that they hoped it would be opened all the way to Kistna, and to the Godavery, by last Michaelmas; but I have never heard of its being done so. If it is, it has cost much less than 1,000 *l.* a mile.

2255. Is there a single canal which is navigable with the exception of those in the delta of Madras which gives any return on the navigation?—I do not know what are the returns on the Ganges Canal navigation; I have not seen them for a long time.

2256. Is it not a fact that, with the single exception of those three canals, there is no return on the navigation canals throughout the rest of India?—There are very fair returns now for a beginning on the Midnapore Canal, and on the Hidgly Canal.

2257. Are you aware that the Indian Government, in a resolution which was published some four years ago, came to the conclusion that the increased

Lieut. Gen. Sir *A. Cotton*, K.C.S.I.

20 June 1878.

Chairman—continued.

increased cost of making an irrigation canal navigable, and the small return which they derived from this increased cost was such as to make it in many cases quite impracticable?—I say it is directly contrary to the fact.

2258. You admit that there is not a single navigable canal that has paid except those three;—The Ganges Canal was brought to Cawnpore, and had six essential defects in it, and the locks connecting it with the river, were not allowed to be used. The Orissa Canal was carried 60 miles from Calcutta, and ended in the middle of the delta. Supposing they had done that with the railways. What in the world had those got to do with the actual returns of the canals; and this canal carried from Calcutta and ending at nothing, not even in a great town in the heart of the delta, is now actually yielding 3½ per cent., and increasing most rapidly.

Sir *George Campbell.*

2259. On what capital?—On 6,000 *l.* a mile.

2260. Are you aware that the Hidgly is a tidal canal in low land?—Yes. It cost 6,000 *l.* a mile, and it is returning 3½ per cent., though it ends at nothing.

Chairman.

2261. There may, therefore, be canals which, under favourable conditions, will give a certain return, but the general result of our experience of the last 20 years is, that navigable canals throughout India have not paid?—My reasons which I give for that are quite sufficient. If the railways had been carried 100 miles here and 50 miles there, stopped in the middle and ended at nothing, and kept hanging on for 20 years, what would have been the result? Supposing there was a railway 100 miles out of Benares, ending at nothing, people would have turned round to the railway engineers and said, "Look at the result of your work. Millions and millions have been spent upon them, and no hesitation upon the question whatever, any amount of millions have been spent upon them, and we ask for 100,000 *l.* or 500,000 *l.* to complete a line of canal, and it is refused."

2262. Cannot you give any reason for the Indian Government being anxious to prosecute railways?—I know the reason perfectly well, but I cannot give it.

2263. Why not?—It would not be respectful, but I know perfectly well what it is. They have not done it; there is the fact; there is no denying that.

2264. I suppose the reason is, to use your own words, the dread of the officials of cheap transit? Yes; that is the horror of the whole official circle now.

2265. Do you really mean to say that you think that for the last 20 years every Viceroy and every official connected with the Public Works Department and the Council of India, generally, and all the Secretaries of State have been actuated by, as you put it, the dread of cheap transit?—Yes; I only say what are facts; I need not say anything. I say, is the Canal from Calcutta to Cuttack finished; is the link connecting the Lower Ganges Canal and the Soane cut: is the Ganges Canal put in an efficient state of working or not; are the boats permitted to go through the locks into the Ganges or not? It is not what I say. These are facts.

Mr. *Sampson Lloyd.*

2266. What is the dread of cheap transit; is it lest it should affect the traffic on the railways?—It is not what I say; this is Mr. Leslie's statement, the head railway engineer.

Sir *George Campbell.*

2267. Does Mr. Leslie say that the Government officials dread cheap transit?—No; what he says is, about the cheap transit that there would be over the canal.

2268. The question is, why the Government official should dread cheap transit?—I only state facts.

Mr. *Sampson Lloyd.*

2269. But there is a motive attributed to the Government in saying that they dread cheap transit, and I want to know what is in your mind, why any man should dread cheap transit?—Because it would stultify the railways, that is the sole point; only think of a canal by the side of the Eastern Bengal Railway, which carries some 200,000 tons, and a canal by the side of it carrying 2,000,000 tons, and swarming with passengers and goods, and boats, what a terrible affront to the railway that must be.

Chairman.

2270. Therefore you think it is with a view of protecting the railways that the Indian Government will not spend more money on navigation?—There has been that bias (no doubt they were not aware of it themselves) continually acting against effecting cheap transit.

2271. You think that they are still actuated by this secret bias, although from the figures that I have shown you it is clear that the returns from canals every year are less the more you spend on them, and that exactly the reverse is the case with regard to railways?—That is exactly contrary to what I say; I say the more you spend on them the better will be the return. If you spent 500,000 *l.* on that remaining 80 miles length of the Cuttack canal, the canal would pay an enormous interest if you choose to take toll at this moment.

2272. You have expressed a very strong opinion that it is in consequence of the non-completion of those works they do not pay?—Yes.

2273. Do you remember the report which you wrote on the project of the Madras Irrigation Company?—Yes.

2274. And do you recollect that you advocated it very strongly, and one of the main reasons which you gave was "That one great advantage of this system of works is that it is composed of parts, each forming a complete system in itself, and which as soon as completed will yield its own returns independent of the remaining parts; it must not be supposed that I recommend that one part should not be begun till another is finished; on the contrary, I would undoubtedly commence at once upon every part of the works comprehended in the whole scheme of 2,000,000 *l.* I merely mean to point out that we shall not have to wait for returns till the whole scheme is completed, as if we were building a bridge, but that as soon as one part is executed, it will at once come into effective operation and yield returns;" that prediction has not been altogether realised?—No, the water has been refused. That is another element also which, of course, I did not contemplate. I had been 50 years in the country

and

Chairman—continued.

and never heard in my life or dreamt of the water being refused by anybody in the district. No such thing had ever been thought or heard of that there could have been such inconceivable blundering and mismanagement as that the poor people could not take the one thing of all others in the world that they desired, water. Of course it never entered my head. I could not have put such a thing in the project, but if there is such inconceivable mismanagement that the poor people cannot take the water which they want above everything in the world, and that the works would not pay, I could not add that to my report.

2275. Still, from some unforeseen circumstances your prediction has not been realised? — Not from any defects in the works but from a defect in the management. I am a manufacturer, and I make a locomotive, and I say, "Here is a splendid locomotive," and it is taken to the railway, and it bursts because the man is drunk who works it; am I answerable for that?

Mr. *Onslow.*

2276. Will you explain what is the defect in the management to which you allude? — If I were to go and formally look into it, I could no doubt give the particulars of it; but here, as the Governor has himself acknowledged, the company have been unfairly dealt with, and they have brought in a new element altogether; a man specially appointed to try and put things to rights. That is a complete acknowledgment of the mistakes that have been made, and that is from the Governor's own minute.

Chairman.

2277. Whose minute was that?—The Duke of Buckingham's minute which has just been reported.

2278. In that minute he admits, does he, that the non-productiveness of the canal is entirely due to the Government?—He does not say that it is entirely due to the Government, but "the matter was referred by the Government to its Board of Revenue, who reported in August 1877 that 'nothing short of the appointment of a special officer will suffice to put the affairs of the company in their relations with the Madras Government on a right footing,' and 'recommended that an officer of a sub-collector's standing should be appointed to have charge of the villages irrigated by the canal under the orders of the collectors of Kurnool and Cuddapah, through which districts the canal runs;' at the same time expressing their belief that such an officer 'would probably be able to set things straight in a couple of years or so.'" Then the Government minute upon that is, "From the papers entered above it is clear that no other arrangement will meet the difficulty. It has been decided in the Public Works Department that the appointment of a covenanted officer of some standing should be recommended. It is pointed out in the memorandum of the chief engineer for irrigation, that the company have real cause of complaint; that practically their officers have been doing work which should have fallen upon the revenue establishments, and that Government are under an obligation to set matters on a proper footing without further delay. It is recognised that the ordinary district administration is not strong enough to devote sufficient time to this branch of their duties, and it is undoubtedly the case that the work involved by the formation of the canal is increasing in quantity and importance every season." "The collector of Kurnool, who had been called upon for information on the alleged action of his deputy (who besides other duties had the management of the settlement and accounts relating to irrigation under the canal), in issuing orders practically preventing applications for water being made, as heretofore, by the ryots to the irrigation company's officers direct, reports that the manager of the company had certainly cause for complaint, in consequence of the wording of the vernacular instructions issued by the deputy collector, and that generally he is not satisfied with the way in which that officer's duties have been performed." An engineer wrote that he remonstrated with one of the landowners, saying, "Do not you acknowledge that there is a great increase of crop from the water?"—"Yes, certainly." "Then why do not you take it?" "I cannot stand the persecution that it would bring upon me from the native officers of the Government." And so in Orissa it is just the same. A man said, and many men said, "What is the use of my taking the water; half of the profits will go to the soukar, and half to the zemindar; I shall be no better off."

Chairman—continued.

2279. But the system of land revenue is entirely different, is it not, in Orissa to what it is in Madras?—Yes; I only mentioned what they said.

2280. Therefore we have those two remarkable facts, that in two different parts of India, under two different land settlements, the irrigation works have proved, up to now, complete failures, because the people will not take the water?—Yes, because the water has been refused by the people.

2281. You never anticipated, as you admit very candidly, any such result when you advocated them?—No; there had always been such good management up to that time, that I never thought such mistakes could possibly be made.

2282. Are you aware of the present financial condition of the Madras Irrigation Company?—Yes.

2283. A capital of 1,000,000 *l.* was raised, upon which a guarantee of 5 per cent. was given by the Government; this was expended, and a loan of 600,000 *l.* was advanced by the Government to the company; no interest has been received on that loan, and only a part of the loan has been repaid by heavily mortgaging the work itself; is not that the state of things?—Yes.

2284. So that up to the present moment, or until within the last year, the Government have had to pay interest on the whole of the guaranteed capital, and have lost the interest on the whole of the loan advanced?—Yes, just as they have done on so many railways.

2285. And also they have had to make good the working expenses?—No; the last two years the returns have exceeded the working expenses.

2286. That is the result of the Madras Irrigation Company; I merely wish now, such being the result, to contrast it with your anticipations in this Report; will you just listen to these words? You say, in anwer to the objection, "When we have secured our plunder, it will be a very agreeable task to sit down at our leisure and divide the spoil, but discussions about it before we have it not only prevent our getting it,

Lieut. Gen. Sir *A. Cotton*, K.C.S.I.

20 June 1878.

Chairman—continued.

it, but cause unpleasant differences. It is the actual possession that puts everyone in good humour with himself, and even his opponents. To be convinced of this it is only necessary to read the account of the discussions at a half-yearly meeting, where there is a dividend of 80 per cent., as in the case of the Ganges Navigation Company;" it seems to me that you have repeated before this Committee, unchanged by experience, every opinion that you here expressed!—Precisely. Every single thing that has happened has entirely confirmed it. We cannot possibly mistake about the average cost of irrigation; we cannot possibly mistake about the profits from it, and the increase of produce; there can be no mistake about that. We know that in two cases there has been mismanagement of the works, and that the water has not been used. That is quite a separate thing, which has nothing on earth to do with the works themselves; it is quite a special thing. The Soane works are now in operation, and 270,000 acres are irrigated this year.

2287. Then supposing we were, on your recommendation, to spend 10,000,000 *l.* a year, as the Government allowed this company to be formed upon your recommendation, we might possibly find ourselves in exactly the same position as regards those 10,000,000 *l.* annually as the Government now find themselves as regards the Madras Irrigation Company?—No; in the first part of my answer, I say I cannot conceive that, with all this experience which you have had in Orissa and the Toombudra, you would repeat the same mistake, and keep matters in such a condition that the people cannot use the water.

2288. But the Government might reply that they will not repeat the mistakes, because they will not make canals or irrigation works of which the people will not avail themselves?—The people will certainly avail themselves of the water wherever it is put into their power to possess it.

Mr. *Sampson Lloyd.*

2289. I do not clearly understand what you mean by the mismanagement which caused the people to refuse the water. Of course, if it is the people's fault, we may presume that it is possible at least that the people might be equally obstinate with the future expenditure which you recommend, but if it is the Government's fault, will you kindly define, in some degree, what sort of mismanagement it was which caused the people to refuse the water, and thereby caused your prediction not to be fulfilled?—Why should I do that, when the Governor of Madras himself has done it for me, in what I have read. He states that the company have not been fairly dealt with, and now we must begin upon a more sensible plan, and he appoints an officer to do it.

2290. Has the mismanagement been in the distribution of the water, or in what particular?—You cannot conceive the opposition that there has been to the use of the water on the part of the native officials, who have set themselves with all their might against the people using it.

2291. Then the people who are to blame are the native officials, and neither the Government nor the ryots?—The European officials did not take care that there was a different state of things, by over-ruling it, and putting a stop to it.

2292. Then we understand that you attribute

Mr. *Sampson Lloyd*—continued

the failure of the scheme of the Madras Irrigation Company to the misconduct of the native officials chiefly?—Primarily to them, and next, to the European officials in not putting it down.

2293. Have you any idea what interest the native officials can have in behaving in this way?—They do not like the trouble of it, that is one thing. It is very difficult to explain all these things to a person who has not been in India, but when first we began the works in Godavery, there was an enormous increase of revenue from the irrigation, and the native sheristadar and the people said, "What clever fellows we are; look at the enormous increase of revenue there is," and the Government replied, "Yes, the engineers certainly have accomplished a great deal." Then they said, "If the engineers are to get the credit of it, all we shall do is to prevent the water being assessed wherever we can. All our friends are the owners of land, and all we shall do will be to find excuses for not levying the water rate." And they have actually done so. I suppose there are, at least, 100,000 acres in Godavery that have the full benefit of the water, but do not pay a farthing.

2294. Has no one ever taken the trouble to represent the misconduct of those native officials to those officials above them?—I do not know; I dare say they have.

2295. One would think, if it was notoriously the fact, as you believe it was, that somebody or other would have been zealous enough to speak of this misconduct?—I dare say they have, but I do not know the whole history of the transaction; but what I say is this; here was an individual isolated case. If a report appeared in the "Times" that one per cent. of the passengers on a certain railway in England had died, everybody would understand at once that there had been some egregious mistake. Here is Hooghly, the very district of Bengal, where water is the one thing that they demand and entreat, and here in this one isolated case, the water has been refused.

2296. May I ask you whether the Madras Irrigation Canal is of any use as regards transit?—There was an exactly similar case. It is 190 miles of splendid navigation; and then it is cut off by 80 miles from the North Coast Canal, so that it is comparatively useless.

2297. Do you attribute this want of success as a means of transit to the want of completion of the connecting link?—Yes.

Sir *George Campbell.*

2298. Is there any profitable or successful traffic on those 190 miles?—No, they are only just now putting it on a good footing. They have just got permission to do it; the want of capital has starved the navigation, but they are just now building boats for it.

Chairman.

2299. You spoke of the sum which this canal saved the Government during the recent famine, and which you estimated at 500,000 *l.* The canal, as you are aware, cost the Government, adding compound interest, between 3,000,000 *l.* and 4,000,000 *l.*?—I am not aware of that. It could not have cost that.

2300. How much less do you estimate?—I could make out an estimate in 10 minutes, but I have never made out exactly what it all comes to.

2301. If

Chairman—continued.

2301. If you have never made it out, why do you demur to my statement?—There has been only a million and a half spent, and it could not have been doubled. To double, it would require 14 years' working, at 5 per cent.

2302. Has not the capital been guaranteed 20 years?—No, it was only begun. All the capital had not been expended, I should think on an average, perhaps, more than eight years.

2303. You are aware that a loan of 600,000 *l.* was granted them 12 years ago?—I forget when the works were begun. However, it is certainly not 14 years of full work.

2304. Still the loss is very large?—Yes.

2305. You remember, however, that this work was one which above all others you recommended?—Yes; and it is one of the most complete and successful works, if the water was used, that could be constructed in India. It carries water for 800,000 acres at this moment, 600,000 acres of dry cultivation, and 200,000 acres of wet; and the average increase would be 2 *l.* an acre. That is exactly what I suggested.

2306. And it passed right through the famine districts?—Yes.

2307. Therefore, if people are ever likely to take the water, I suppose they would do so now, having had experience of the famine?—I hope so, if the Government put the thing on a sound footing; not without.

2308. Now I go to another work, the Orissa work; are you disappointed in the result of that work?—I am disappointed in the cost of the works. They cost more than I expected; but there is ample room for an abundant return, even for the present cost.

2309. That is not the impression of the Government of India?—I am quite satisfied myself. There is no answering those things. As it is at present it has cost about 3 *l.* 10 *s.* an acre for those great headworks, with a small area of irrigation, but if the distribution was carried over all the delta, the cost would certainly not exceed 3 *l.* an acre, and 2½ rupees would be eight per cent. upon that, besides any toll.

2310. What you mean to say is, if the work is fully utilised, that is to say, if the water is taken and the full area which can be irrigated is cultivated, and abundant use is made of the navigation of the canal, that then a certain return will be obtained?—A great deal more than the Government interest could be obtained.

2311. But it is only under those circumstances?—Of course, I suppose that the works are carried out. I put the project before the Government, and they say, "Yes, we will do the expensive part; we will delay this for years and years, and add all sorts of expenses and interest to it, and then we will leave out the principal part of the work, and we will turn round to you and say, 'You are a pretty engineer.'" That is the history of the Orissa Work, and the Godavery Navigation Works, and of all these works.

2312. Do you recollect that when you sent in your report concerning the Orissa Work you ridiculed, in very strong language, the absurdity of constructing railways in Bengal?—Yes, I dare say I did.

2313. Are you aware that those two railroads which you thought would be so useless, paid last year between 9 and 10 per cent.?—I daresay they did.

Chairman—continued.

2314. Then it seems now from our experience that you were wrong in your prediction?—No, I was quite right; and I call Mr. Leslie, the chief railway engineer, to witness.

2315. How can you be right when you say that it is an absolute failure if it paid 10 per cent.?—I say it does not carry the quantity, and it does not carry so cheaply as the country requires, that I call a failure. When the chief railway engineer himself says, "Here is a railway which leaves nine-tenths of the passengers and goods behind"; if that is not a failure, what in the world is?

2316. But if it pays 9 or 10 per cent., and only carries one-tenth of the traffic, it is so far as it goes a success, is it not?—No; it is a failure as respects the State; it does not carry the goods that are wanted to be carried.

2317. If it is remunerative, and the Government undertook it on the ground that they would get a certain return from it, surely it is a success?—Because they took an entirely wrong view of the subject. They were seeing whether they were to get 5, or 6, or 9 per cent. for their money, instead of whether it would do the work that there was to be done.

2318. If we apply the same test to this canal in Orissa which you apply to the railroad, the canal is an absolute and complete failure, is it not, because it has not done the whole of the work which you think it ought to do?—Because it is not carried out; that is all; nothing else in the world. I did not say that if you carried the canal from Calcutta halfway to the Ganges and then stopped, that it would then have paid 10 per cent.

2319. Possibly when the line was commenced it showed signs of a return which induced the Government to complete it?—There was no sign of it for years and years. It is in debt now, and it has not paid the interest upon its debt now; it is not solvent. The East India Railway is the only railway in India that is solvent at this moment, that is to say, it pays the interest of its whole cost and debt; that is the only one. There is fifty millions of debt on the railways at this moment.

2320. That is calculating the arrears of the guaranteed interest?—Yes. How can this be answered? Works that do not pay their interest of cost and debt, that do not carry the traffic of the country, and that charge a rate which does not answer the purpose of the country; how in the world can those be said to be a success?

2321. I do not see the difference between those works and the two works which you recommended in those particulars, because those two companies, the Madras Irrigation Company, and the Orissa Canal Company have failed more completely than the railroads to do the works which you estimated they would do, and they have in addition been a heavy financial loss to the Government?—Suppose the whole power of the Government had been laid to keep back the railways and to help forward the irrigation work, what would have been the result then?

2322. But you assume that the whole power of the Government has been employed?—Yes, evidently, or else why are the works not carried out? There is no answering that. Here is the fact, that the main canal from Calcutta to Cuttack is not finished to this day. There is no getting

Lieut.-Gen. Sir *A. Cotton*, K.C.S.I.

20 June 1878.

Chairman—continued.

rid of that fact. The Upper Godavery Navigation Works which were projected in 1853 are not complete now, 25 years afterwards. There is no getting over those facts.

2323. It may not be completed, because the Government did not see the utility?—Because they would not give the money to complete it

2324. And you think that they sanctioned this work and this expenditure with the deliberate intention of leaving it unfinished?—How can you account for it; there is the fact that they are unfinished to this day.

2325. Are you really serious in stating before this Committee that you believe that successive Governor Generals have given their sanction to the construction of certain irrigation works with the deliberate intention of leaving them incomplete in order to protect the railroads?—I only mention facts; what on earth is the use of arguing against facts? Here is the Godavery Navigation after 25 years not completed. Here is the Cuttack Canal not completed. Here is the distribution of water in Orissa not completed. That is no opinion; they are facts. The railway from Calcutta to Benares is finished; there is everything finished in connection with the railways whatever it costs.

2326. The reason seems to me obvious that the Government tried the experiment of making railroads and irrigation works, and navigation canals, and found that the one answered and paid whereas the other did not?—They did not find that the one answered; for in the case of every railway in India it was 10 or 15 or 20 years before they even paid interest on the cost, to say nothing of the debt. They went on in spite of there being no returns at all worth mentioning.

2327. You say that they do not pay, and that if you applied the same test to irrigation works which you do to railway works, they would be found to give a much better return?—Yes.

2328. As I understand your figures, without going very much into detail, you credit to irrigation the whole of the water-rate, and the whole of the increase of the land revenue due to irrigation?—No, I do not add that. I only take the water-rent. I said that a great part of the increase of the general revenue is due to them, but I did not put it into my calculation.

2329. But the land revenue you did?—No, only the water-rent.

2330. How do you get the increase in the Cauvery and the Godavery?—The case is as simple and as plain as words can be. Here are so many acres of unirrigated land, yielding a rupee and a half, and here are so many acres of irrigated land yielding five and a half rupees, as the effect of the irrigation. There is no difficulty about that whatever.

2331. That is to say, that the land revenue derived from that area is increased by so much per acre?—Yes, four rupees an acre is the water-rate. The money that is due for water-rent is four rupees an acre in Tanjore.

2332. Is that the system throughout Madras?—Yes.

2333. In the North West Provinces are you aware that there is another system?—Yes, there they charge two-and-a-half rupees.

2334. Theirs is a system by which they pay a certain sum in water-rate, and there is also an indirect return to irrigation taken from the increased land revenue?—I do not know why they do that. There is a great increase of land revenue in Madras, but it is never charged to the irrigation account.

2335. If you look at the Public Works Accounts you will see credited to irrigation direct and indirect receipts, and the indirect receipts mean the enhanced value of the lands from the irrigation?—Yes.

2336. What indirect results do you credit to the railroads, because railroads increase the value of the lands through which they pass?—It is not perceptible. They may increase the value of a few acres of land just round the station perhaps. I do not know how that may be.

2337. Do you believe that the land in the immediate vicinity of the railroads that have been constructed throughout India has not increased in value?—No, I should think not perceptibly.

2338. Land in this country is more valuable in the immediate vicinity of railroads, is it not?—Yes.

2339. Why should the reverse hold good in India?—Only that it does not. There are abundant reasons for that.

2340. You have not been in India, have you, since the system of railroads has been completed?—No.

2341. Therefore in stating that the railways have not increased the value of land, you are not stating the opinion of any official who has recently come from India?—There are no indications of it, in any way that I know, showing that it has increased the value of land. The districts of Madras which the railways run through are all just in the same state that they were.

2342. When the Land Settlements fall in, do not you think that the land in the immediate vicinity of a railway station will be assessed higher than at present?—Perhaps a few acres just around a station may be.

2343. But it affords facilities for the transport of produce?—Yes, but at such a price that it can hardly be carried, and then only the small produce, not the great produce.

2344. Have you looked at the increase of the wheat traffic in the last few years?—Yes.

2345. Are you aware that nearly the whole of that increase has been carried by railroads, although the Ganges run side by side with the railroad?—Yes.

2346. How do you reconcile that fact with your statement that the cost of transit by railways is too expensive?—Because the river is nearly as expensive, including all its wandering course and all its drawbacks, insurance and everything, it is nearly as costly as the railway, but that has nothing to do with the steamboat canal; it is very difficult transit on the river.

2347. I cannot understand how the transit by water can be as expensive when there are no tolls to pay, and there is nothing but the loss of time?—And the risk.

2348. If you had those canals with steamers going, as you propose, at the rate of 15 miles an hour, there would be very serious risk on the canals, would there not?—I do not know why there should be. It often puzzled me how the boats could live on the river. I was standing on the banks of the Ganges one day when one of those north-westers came on, and out of a fleet of 24 boats in the stream about 20 went down immediately.

2349. What

Chairman—continued.

2349. What time of the year was it?—It was during the time of the north-westers, in April.

2350. At the time when there is a great export trade at Calcutta?—There was an immense traffic on the river, as there always is, in spite of those drawbacks.

2351. But still you cannot deny that the greater part of the wheat which has recently been exported from India, has been carried by rail, and not come by water?—I daresay it answers to bring it at a halfpenny a ton a mile.

2352. Are you also aware that the officials of the Punjab and Scinde anticipate that when the Indus Valley Line is completed, there will be a great impetus given to the wheat trade in Bengal and the Punjab?—Yes, there will be some impetus in spite of all the drawbacks. I think if there had been a canal cut there, it would have given all that the North West and all the Punjab required. The wheat carried between the North West and Kurrachee would have been almost entirely annihilated, and the canal would have given new value to every atom of produce that they had. May I add that Mr. Robertson, the superintendent of the Government Model Farm, was sent to report upon the state of Coimbatore, and this is one of the things he said: "The high price which the right of occupying this irrigated land commands (sometimes as high as 250 rupees per acre), convinced Mr. Robertson that the Government demand, ranging from 9 rupees to 13 per acre" (four times what they are taking in the North West), "was not excessive." But they charge 10 or 11 rupees an acre, and 1 *l.* an acre, where they are selling land at 25 *l.* an acre in Coimbatore, an out-of-the-way part of the country. That will give you some idea of the increase of value by irrigation.

2353. What was the canal from which they got their water?—One of the old native canals in Coimbatore. There is a great deal of old native canal irrigation in Coimbatore; as much as 100,000 acres.

2354. You expressed doubts as to the harm done by that saline efflorescence called the reh, and you did so on the ground that you had never seen it; but you have not been in any part of India where that has broken out?—No.

2355. Never having had any particular experience of that part of India, you could hardly pit your opinion against that of officers who have seen it?—It is no opinion; I only speak of facts; it is an exceptional case. There are 20,000,000 acres of irrigated land in India. How much of that is covered with reh? Not a thousandth part.

2356. But in the statement which you have made you attached no importance to the outbreak of reh, because you said you had never seen it?—I did not attach no importance to it; I said it must be exceptional, because there are 20 million acres at this moment in India probably that are not suffering from it. I did not say that it was of no importance, but that it must be inquired into.

2357. You said that you had never seen it?—No; I only gave that as a proof that it cannot be a general thing there; and all the years I have been in India, and all the millions of acres of irrigated land that I have passed over, I never saw an instance of it.

2358. You could not have seen it, unless you had been in in the North West, or the Punjab, during the last 20 years, where it exists?—Therefore it is an exceptional case.

2359. But it need not necessarily be exceptional; it is the result of a certain system of irrigation which was not in force when you were in India?—I only speak of the fact that a very small extent, comparatively, is stated to be affected by reh.

2360. It depends upon what you call small; it is a very considerable tract?—But it is a very small part of the whole.

2361. Have you read Colonel Fife's evidence?—Yes.

2362. Colonel Fife stated that the return on the irrigation works which have been constructed in Bombay was only half per cent?—Yes.

2363. You do not attribute this to any mismanagement of the revenue itself, but simply to the fact that the people have not yet appreciated the benefits of irrigation; would you go on constructing works in such a case?—I say I would inquire into every individual case. That evidence of Colonel Fife is generally against irrigation in the Upper District of the Bombay Presidency; but I should go and inquire into each case, and see what can be made of it. If it cannot be done, of course I cannot help it; but each individual case must be inquired into.

2364. But I understand you to recommend as a *sine quâ non* that irrigation should be carried out in every district in India?—Yes, so far as circumstances permit it in every district.

2365. Therefore you would make this general recommendation subject to the particular conditions of each district?—Of course; but I may add this, that there are cases where I would not let its not being likely to pay 4 per cent. prevent its being done, because other circumstances may make it very urgently needful; a famine for instance.

2366. You are aware that no great irrigation work has been sanctioned by Government, except on the ground that it would be remunerative, and pay interest on the sum borrowed for its construction?—Yes.

2367. And it is only when the primary condition upon which this outlay was sanctioned has failed, that its advocates argue that it would be very useful to mitigate or avert famine?—But I do not admit that there is a single acre of India that would not be the better for irrigation, and that would not in itself pay amply for being irrigated. That is the point which I insist upon, that the increase of produce will abundantly pay for any expenses of irrigation; and it is a secondary question whether the Government can so manage that they can get a proper per-centage for the Treasury. Before we leave this point, will you just allow me to read a few words from Colonel Haig about the refusal of the water, as we have touched upon that subject. It is with reference to the Hooghly district in Bengal, where the water has been refused. "There is not a single river, drainage, watercourse, or channel of any description, large or small, in the whole district that is not bunded across at frequent intervals, from one end to the other, for the purpose of storing the water; not a pool, puddle, or water-hole, the right to which is not most jealously guarded. It is almost incredible the amount of labour and effort thus expended by the ryots (the zemindars, as a rule,

Lieut. Gen. Sir *A. Cotton*, K.C.S.I.

20 June 1878.

Chairman—continued.

do nothing) to secure, as far as possible, every drop of the precious element; and it strikingly illustrates the actual need that is felt for *more* water, for a more certain and continuous supply, in a district where the natural supply might have been supposed to be sufficient."

2368. Are there only three rivers in the Madras Presidency which rise in the Western Ghats?—Yes, three large ones, the Godavery, Kistna, and the Cauvery.

2369. Therefore there are only three large rivers whose sources of supply are independent of the rainfall in the district?—Yes, there are the Pennair, the Pallar, and the Northern Pennar, all of which rise in the apex of the country near Bangalore, and they are all doubtful rivers.

2370. How far have those three large rivers been fully utilised?—Not a hundredth part of them.

2371. Are you aware that the Madras Irrigation Company are obliged to shut off any demand upon the feeders of the Kistna during a certain time of the year?—Yes.

2372. There may be a great surplus of water in those rivers which goes down to the sea annually; but the question is how can you divert that water to other parts of the country at a reasonable cost?—Exactly as the Madras Company have done. They are allowed water from June to December inclusive, seven months; a sufficient time for two crops, and all that time there is an immense superabundance of water in the rivers. They have led water out of the valley of the Kistna into the valley of the Pennair, and the principal part, almost the whole of the land, is in the valley of the Ponnair, and have carried it across the watershed, and it may be done everywhere just the same. That has been done very extensively by the natives.

2373–4. I suppose you quite agree that no security could be given to Madras against drought by the construction of tanks which are simply dependent upon the rainfall?—No; the famine showed that.

2375. And you think as to these three rivers that a great deal more might be made of them?—That thousands of tanks could be supplied from them at a practicable cost, there is no doubt about it.

2376. Do you recollect your report which you wrote in 1853 upon the condition of the tanks, and upon public works in Madras?—I wrote a very full report in the year 1837.

2377. There was a Commission, of which Sir George Balfour was chairman, by which certain provisions were made, that the tanks which were hitherto under the control of the collectors or the civil authorities should be handed over to the Public Works Department; that has been done, has it not, in Madras?—I was not a member of that Commission; my brother was. I do not know.

2378. In the evidence which has been given to the Committee, it seems that there is scarcely sufficient facility given to the collectors of the different districts in Madras of extending or enlarging the smaller works and tanks because they have no funds at their disposal?—That is the case.

2379. Have you any suggestion to make as to whether those works should be under the civil authority?—No, they should not be under the civil authority. I would give this fact, and I

Chairman—continued.

cannot see how anybody can mistake the conclusion from it. I have got here a large volume, the Madras Administration Report, of 400 pages, and those tanks are dismissed without one single word of report upon them; what they are doing, they are not doing, what they can do, what state of repair they are in, or anything else. Civilians will not think of them or care a straw about them. There is a report which goes into every detail of the Government of Madras from beginning to end, and here are works upon which four million acres of irrigation depend, of which they do not think it worth while to say a single word. We had one school of civilians at Madras who understood irrigation, and attended to it. That was Mr. Kindersley's School at Tanjore, and Sir Henry Montgomery, who was sent up to Godavery, and who originated the Godavery work, but we have never been able to get others to take the matter up.

2380. Then you would prefer that even those small works should be under the control of the Public Works Department?—Yes, nothing will be done unless they are under the Public Works Department.

2381. You have suggested a great many schemes and put forward a great many proposals concerning irrigation; there is one scheme in particular which I should like to call your attention to, and it is the one to which Mr. Bright alluded, by which you propose to spend 30,000,000*l.* in making navigable canals all over India; I presume that your figures are a mere estimate?—Yes, of course they are only rough judgments, but taken from the actual cost of thousands of miles that we have cut.

2382. Have you estimated for canals which passed through parts of the country which you have never surveyed?—There are only one or two spots which I have not seen with my own eye.

2383. There was one canal to which you alluded in your evidence which you proposed should run from Cape Comorin to Carwar; that canal could not possibly pay?—I do not see why not.

2384. What would it be used for?—For an immense transit along the whole coast, for internal transit. Why have the Travancore State cut the worst part of it already.

2385. Where does that canal go from?—It is an extension; we have cut bits of canals there which are very imperfect ones, and they have extented them down through the Travancore country, and they have got through the worst cutting on the line.

Sir *George Campbell.*

2386. Have you examined the country up to Carwar?—I have seen almost every point of it.

2387. Have you seen that part near Carwar?—I have been all along the coast up to Carwar.

2388. Do you think that near Carwar the country is practicable for a canal?—Yes, I went up and examined that part particularly; I saw that end of it, which is the only point which I had a doubt about.

2389. Then it is easy at the end?—Yes, there is nothing to prevent a canal being carried from Calcutta to Cape Comorin, and from Cape Comorin into the Harbour of Carwar, that I can say of my own personal knowledge.

Chairman.

2390. You would propose that for the internal traffic alone?—For the internal traffic and carrying goods to the port.

2391. But there is not much traffic along that side of the country, is there?—We make lines of transport to enable people to carry things; we do not make them, because they are carrying them already without lines of transport. The mistake about transit is, that you talk about communication, as if they were things to carry what is now carried; they will carry now what is carried, but what they are made for is to make and create traffic; to make it possible to carry things which are not carried now. Was the railway from here to Greenwich made to carry the passengers that travelled by coach, or to create passenger traffic; perhaps not one per 1,000 of the present traffic on that line went by coach; it was the railway that made the traffic, and so with every communication.

2392. But it is a somewhat speculative enterprise, is it not, for Government to go into to create traffic all over India?—That is the grand thing that they have got to do, to create traffic; that is their grand business.

2393. But they may find themselves in very great difficulty by making a system upon which no one can depend, and leaving the railroads along which the traffic will travel?—A great deal could be shown very plainly in unmistakeable figures. Look at the letter of Mr. Leslie, there is no mistake about that; it is quite impossible that anybody in the world can mistake those figures of Mr. Leslie's.

2394. You were equally confident about your figures in connection with the Madras Company and the Orissa Canal Company, which have not been realised?—Because of that one single thing; because they refused to take the water.

2395. But something unforeseen might occur in this grand scheme for the development of traffic?—That may happen of course, but we must act from what experience we have have had at present. We have had an immense experience; we have abundant data to go upon; we have spent 170,000,000 *l.* on railways, we have spent 16 millions on irrigation, and we have now abundant data before us to judge of any individual project that is brought forward.

2396. This is the process by which you arrive at those conclusions, but I do not think it is a financially sound calculation; you charge, do you not, against railways the whole of the accumulated interest?—Yes, just as one of the witnesses did against the Ganges Canal.

2397. Then you go on to say that the capital spent on water works, including the Toombudra, is 16,000,000 *l.*?—Yes.

2398. The accumulation of interest against the Baree Doab, with the Ganges and other canals, is much more balanced by those to credit on the Cauvery, Kistna, and Godavery works, which have at least 10 millions to their credit; you lump all those works together, and you make those works which have paid in Madras, counterbalance all the more recent works which have not paid elsewhere?—Just as I do with the railways; the railways that are paying interest are lumped all together with those hundreds of miles which are not paying interest.

2399. But then we have to find in India districts or areas the physical conditions of which will be similar to those of the Delta in Madras,

Chairman—continued.

and if irrigation works have, in future, to be conducted under conditions similar to those which have recently failed, it consequently follows that by spending annually a large sum, you will only have in your hands works which will not pay, and against which you will not be able to put the unfinished works, such as the Cauvery and Kistna?—You must judge of every particular case by its circumstances, no doubt.

2400. But it does not follow that, because it would be wise to spend four or five millions in the Delta of Madras, therefore you should spend 20 or 25 millions on other parts of India?—I do not draw any such conclusion; I take the whole cost of irrigation up to this time wherever it has been carried out.

2401. But if you exclude those works in the Delta and certain Sindh works, you will have a very bad balance-sheet?—Not a very bad one; on the Ganges Canal, for instance, it very nearly pays its interest; there is very little loss on the Ganges Canal, which is the largest work of all, and there it was simply from the fundamental mistake in the projection; they went up into the mountains and spent a million in bringing water out of the hills on to the plains, when they could have got it where they are now getting it, by the Lower Ganges Canal in the plain. That was a mistake, but it will not be repeated.

2402. You sometime back made a suggestion, I think, to the Indian Government to establish a great central reservoir in the middle of India?—Yes, on the Toombudra.

2403. But you have never surveyed that scheme?—There is an officer now in England who has surveyed it thoroughly; and I know all the papers about it. I have been up to that part of the country. I know the country; I have seen all the papers and reports about it, and I have talked it over with that officer, who has seen every bit of it.

2404. Do you think that it would add to your undoubted reputation as a successful engineer if you advocated the construction of a great reservoir in a district which you have never seen?—But I have seen it; I have been up there, as I say, at the very spot, at least to that part of the country, and I know the style of country quite well.

2405. Are you aware that that scheme has been very severely criticised and pronounced utterly impossible?—Yes, like everything else. The Suez Canal was denounced as impracticable, and that it would be of no use when it was done.

2406. Surely, people who have been there, and have surveyed the district, are more likely to be right than any engineer who has not been there?—There is an experienced officer at this moment in England who has as thorough a knowledge of the whole thing as anybody has, and he is entirely in favour of it. I refer to Colonel Fisher.

Sir *George Campbell.*

2407. Has he made a report?—Yes, and estimated the whole thing.

Chairman.

2408. Have you not put forward some schemes rather with the view of stimulating the energies of the Government, than with the belief that they are perfectly practicable?—No, I never put anything forward but what my immense experience

Lieut. Gen. Sir *A. Cotton*, K.C.S.I.

30 June 1878.

Chairman—continued.

satisfied me that, either it could be done, or that it was worth investigating. This is a case where I wish it to be investigated; but as to the Toombudra project, I know it is perfectly practicable.

2409. This scheme for making canals to cost about 30 millions you are aware that Mr. Bright spoke of with the utmost confidence, and he said it was a thing that must be done?—Yes.

2410. Do you believe that there is any engineer in India who would undertake to do this for 100,000,000 *l.*?—I do not know, for I had nothing to do with it; all that I have to do is to show that with the actual data that we have, it can probably be done for that sum. Then let somebody examine it; not a man who has determined that it cannot be done, and shall not be done, but somebody who is heartily interested in it; let him examine it and report upon it. The last time I was examined before a Committee of the House of Commons, it was in the way of a taunt said to me, Yes, you would cut a canal from the Sutlej to the Jumna. That very thing is done.

2411. Have you not been rather apt to assume that whenever any report was made unfavourably to your project, the officer who so reported was biassed against you?—Yes: so they all are.

2412. I have read some strong language applied to myself, and you have also accused the India Office, and all the officials, and the Governors General, and the English papers generally, as being in conspiracy against your plans; is not that rather rhetorical language?—What am I to say. The India Office send me a report, and I answer every paragraph of it. They not only will not prove that I am wrong, but they do not condescend to acknowledge the receipt of it. I write to the "Times" and "Daily News." Anybody, a lawyer, or anybody that knows nothing about the matter, writes three columns to the "Times" to tell them all about engineering, whereas, when I write them a reply to it they will not put it in; that is the real fact. There was Sir James Stephen wrote a letter of three columns to tell the people all about irrigation; he knows no more about irrigation than I do about law; I write an answer to it, and not one of the papers will put it in; these are the real facts.

2413. Why should you assume that a large proportion of people in England, and all the officials in India, should be in this conspiracy so against you, when you can at once put them in the way of greatly increasing the wealth of India?—If they can answer me, why do they not; they will neither allow me to answer those who start those things, nor will they answer what I say. Only just look at the history of the Suez Canal. The greatest statesmen in England, the Houses of Lords and Common, the manufacturers and shopkeepers, the religious and benevolent societies, and the whole of the population of England, were opposed to the cutting of the Suez Canal, and it was obliged to be cut by an opponent country, France. Just look at the fact. Which was right? M. Lesseps, or all England.

2414. You think that that is a parallel case to the position which you occupy towards the public as regards this irrigation scheme?—Exactly similar; why do they not answer me.

2415. But it might be possible to reply to you that you have been very fully answered; that you were not content with the answer?—I have got no answer. I have seen none.

Chairman—continued.

2416. Then are you still under the impression that it was a deliberate attempt on the part of everybody connected with India and the public generally to ignore and put on one side your proposals?—Not everybody; because things have now made great progress. There are a very considerable number now who begin to look into these matters for themselves; independent people.

2417. You can attribute no other reason or motive for this very improper behaviour, except that it is the wish to protect railways?—Yes; to bolster up railroads; that is the source of the bias.

2418. You stated in your evidence that a very large loss of life during the recent famine was due to railways?—Yes, that is to say, that the railways have not prevented it.

2419. That is not an accurate expression, for when you had said that, you should have gone on and have shown how many lives railroads have saved?—No, the irrigation works have prevented loss of life in those districts of Madras, and railways have not. There are not hundreds of thousands dead in the irrigated districts of Madras, but there are on the railway districts; there is no denying that.

2420. That must be self-evident, because if a district is thoroughly irrigated there cannot be famine in it?—No; then I say that irrigation works do prevent death by famine, and railroads do not.

2421. But supposing there had been no railroads what would have occurred then?—There would have been more deaths.

2422. Then the railroad has not lost life, it has saved life?—In one sense they have saved life, but they have not prevented loss of life, that is to say, they have been an ineffectual remedy; they certainly have done something, they have helped it, but nothing like what canals would have done if they had been there.

2423. Assuming that canals could have been constructed all throughout the famine districts, and that they would have been amply supplied with water during the two years drought, you say that the loss of life would have been less than it has been?—Yes.

2424. But it is not fair to attribute the whole loss of this life to railroads?—To the failure of the railways to prevent it; that is a fact.

2425. But the railways never undertook to prevent it?—I do not know what they undertook; I am only stating the fact that irrigation does prevent loss of life by famine, and railways do not.

2426. That is to say by irrigation you mean irrigation which is fed by rivers whose supplies can be depended upon?—Yes.

2427. But you are aware that there are an enormous number of tanks in these famine districts which completely failed and were dried up?—Yes, because they had not been supplied from the great rivers.

2428. Therefore it might be just as proper to attribute the loss of life to the failure of the tanks?—So it was; the tanks were insufficient and they failed certainly in this case; there is no doubt of that.

2429. Supposing your advice had been adopted, and we had no railroads in India, and nothing but navigable

Chairman—continued.

navigable canals, and supposing that there had been two years of drought, as there was in Madras, your transport of water would have failed you just at the very time that you wanted it?—Not the slightest; it would not have had that effect at all. There would not have been the slightest difficulty in supplying the canals with water, for they would have been connected with unfailing rivers.

2430. You admit, do you not, that there are only three unfailing rivers in the whole of the Madras Presidency?—Yes; but they would have been supplied from those; there would have been no difficulty whatever about it.

2431. But the connection with those rivers must have been very lengthy in many cases?—Yes, they would have been so in many cases.

2432. Certainly if there had been no rain for two years, what with evaporation those canals would in all probability have been dry?—No; they could easily have been secured with a supply of water; I speak as an engineer of experience, and I say there would have been no difficulty whatever in supplying the canals with water even in those years.

2433. You speak as an engineer of experience, but you are merely expressing your opinion upon a system which has not been in force, and which is not in existence, and therefore your opinion is a mere surmise?—It is not surmise; it is the result of my knowledge of the matter.

2434. If an unlimited number of canals be made, you say that there would never be any fear of their not being navigable through want of water?—Never; it would be a very small part of the expense indeed to secure their being supplied with water always; that is the point.

2435. Then, I suppose, you would establish great reservoirs to feed those canals?—In any way; in some places they would lead direct from the river, and sometimes it would be done by storing the water in different ways, according to the particular circumstances of each case.

2436. I do not see any estimate for the cost of those reservoirs in this scheme of 30 millions?—No, it would be a very small amount; when I talk about 3,000 *l.* or 4.000 *l.* a mile I include everything; I made an estimate, in one instance, for a canal that would cost 2,000 *l.* a mile in an out-of-the-way part of the country, where water was not so convenient, and the cost of the water was 100 *l.* a mile out of the 2,000 *l.*; if the canal cost 2,000 *l.* a mile, I consider 100 *l.* out of that to supply it with water is not any great sum.

2437. You must recollect that, in the case which I have put to you, the whole of your reservoirs would be dry?—I am speaking now of having a secure supply either directly from rivers, or by leading streams from rivers which never fail, into tanks.

2438. Which is the largest river in Madras; that is to say, which discharges the largest volume of water?—The Godavery is the largest.

2439. During the recent famine the volume of the Godavery was enormously diminished, was it not?—Yes, enormously.

2440. Then it seems to me pretty clear that in a prolonged drought you would not have sufficient water for your canals?—Not from the Godavery; they are not using 1-50th part of the water from the Godavery.

Chairman—continued.

2441. You mean at certain times of the year?—No, I am speaking of the whole volume of the river.

2442. The discharge varies very much, does it not?—Yes.

2443. It would be the lowest, I assume, at that time of the year when you would be suffering most from the want of water, and when there would be the greatest need of using those navigable canals; surely there would be danger then of your supply failing?—Never; not the least in the world; the water consumed by the canal is a drop in the bucket compared with the river even when its smallest stream is at the lowest.

2444. Those canals are to be used for irrigation purposes besides?—That is another matter; we are speaking now of transit. If they are used for irrigation, of course they must be supplied with water for irrigation.

2445. Still if you construct those canals which are to serve for irrigating purposes as well as those of transport, you would be in this difficulty in the case of a great famine or drought, that you would either be obliged to refuse the water to the cultivators, or else your transport would cease?—I would keep water enough in the canals for navigation, of course; I would not consume the water that was absolutely necessary for navigation.

2446. Then you would be in this dilemma, that at such times when the people wanted the water, you could not give it them, because if you did give it them, you would stop your transport?—I am only speaking of providing a certain quantity of water for irrigation; and besides that, a certain quantity to secure the navigation.

2447. But at the very time when, above all others you would want a full supply of water, you must necessarily run short?—As I say, I would supply those canals abundantly for both purposes, from the great rivers.

Mr. *Cross.*

2448. Is there always, at all times of the year, enough water in those great rivers to supply sufficient water for irrigation and for navigation also?—Yes, for navigation, and for a certain amount of irrigation; but I would only use the water for irrigation when the rivers were held sufficient.

Sir *George Campbell.*

2449. Is it not the case that in those famines the rain so far failed that the rivers were not full at the time when they were wanted for irrigation?—The Godavery was not full; it only contained 50 times as much water as we could use; it was as empty as that. All I can say is, that there are thousands of millions of cubic yards of water flowing into the sea by our rivers every day, and there is no want of water.

Chairman.

2450. Then the general purport of your evidence is, that you have not altered your opinions in the least?—Not the slightest in the world; the whole thing that has been done has confirmed me more completely.

2451. You are not in the least deterred by that admitted failure to which we have alluded both in the case of Madras irrigation and the Orissa Works?—Not the least in the world.

Thursday, 27th June 1878.

MEMBERS PRESENT:

Mr. Agnew.
Mr. Ashbury.
Sir George Campbell.
Mr. Childers.
Mr. John Cross.
Mr. Fawcett.
Lord George Hamilton.
Mr. Hardcastle.
Mr. Sampson Lloyd.
Mr. Ernest Noel.
Mr. Onslow.
Mr. Pease.
Mr. Edward Stanhope.

LORD GEORGE HAMILTON, IN THE CHAIR.

Lieutenant General Sir ARTHUR COTTON, K.C.S.I., called in; and further Examined.

Lieut. Gen. Sir *A. Cotton*, K.C.S.I.
27 June 1878.

Sir *George Campbell.*

2452. I UNDERSTAND the view which you have expressed to be, that now your opinion is that communications are even of more importance than irrigation, but that you consider that railways are so far a mistake, that they are expensive and insufficient, and that water carriage is much better and much cheaper?—Yes.

2453. And then I understood you to say that inasmuch as the Indian rivers are in many respects bad for navigation, the Ganges in that respect being, I think, as you said almost as costly as a railway, you wish to supersede that bad river irrigation by artificial canals?—Yes.

2454. And then I gathered, although I do not know that it is expressly stated, that your object was to introduce steamboat traffic upon those canals; is that so?—Yes; I do not mean to insist upon steam traffic; I only make them capable of steam traffic. I fully expect that 19-20ths of the traffic would go on without steam.

2455. You propose to make your canals capable of steam traffic?—Yes.

2456. I observe that throughout your whole argument and your whole evidence. everything seems to be based upon the assumption that we can obtain water carriage, such as you wish, infinitely cheaper than railway carriage; what I want to know is this, how far that is a theory, that is your opinion that it might be so, and how far it is justified and supported by existing facts; and with that view, I want to ask you this: putting aside some of the canals in the delta and the lower coast countries, are there now at this moment any canals in India which are successful in the manner and shape which you describe, or which you would wish to see?—I do not know exactly what you may mean by successful; there are perfectly practicable canals that are now in operation in India for moderate distances; if success means returns in money, I do not know, because no one line has ever been completed.

2457. But out of the districts of the deltas and the very low coast district, are there at this present moment any canals which are successful in the sense of carrying a very large amount of

Sir *George Campbell*—continued.

traffic?—The whole of the traffic of the delta of the Godavery is carried in immense quantities; there is more carried by a short line of 40 miles from the Godavery to Cocanada than the average carried on the great lines of traffic of India by railways.

2458. My question was, excepting the delta districts, and the very low coast districts, has any canal been successful in the sense of carrying at this moment a very large traffic in any other part of India?—The only canal that could be called so is the Ganges Canal, and upon that I have had no particulars for many years. The last time I heard of it, it was carrying about 100,000 tons per annum, but I have not heard of it for several years. To show the contempt with which the whole thing is treated, there is the North Western report in which they do not condescend to mention a word of the traffic on the Ganges Canal.

2459. Still you are aware, as a matter of fact, that there have been defects in the Ganges Canal which have interfered with navigation up to the last information of that kind, so that there has not been a very large water traffic on the Ganges Canal?—I do not know. It was so imperfectly done that, as I said before, there were six essential defects in the navigation of the canal. One of them is, so absurd as this, that the loaded boats could not pass under the bridges.

2460. Not making any exception with regard to the low districts, is there any canal in India in which there is an effective and successful steamboat traffic at this moment?—Not steamboat traffic, because there are no steamboats; but the canals are perfectly fit for steamboats. The canal, from the Godavery to the Kistna, 90 miles in length in the delta, is perfectly effective for steamboats. I carried the Governor of Madras along it myself many years ago, on that very line, in a steamer.

2461. But there are no steamers upon it?—There is the steamer of the Engineers' Department, which works upon it occasionally.

2462. There

Sir *George Campbell*—continued.

2462. There is no steam used by the traffic of the country?—No, it is entirely conducted by the natives without steam.

2463. Going beyond India, can you tell us from your immense experience whether in any part of the world, with the exception of one or two large canals which join great ocean or lake navigations, there are great steamboat canals which are now operating successfully and profitably?—I cannot mention any. There are thousands of miles in France that are regularly worked, I believe, partially by steam, and there are several lines in England that are worked by steam; the Forth and Clyde Canal, and the Weaver navigation, and others that are worked by steam regularly now.

2464. Still, since you refer to England and Scotland, is it not the case that since the railways have been introduced, the canals have been, speaking generally, beaten by the railways, and have ceased to be successful, and paying to that degree, that a paragraph went the round of the papers the other day, stating that there were many canals which had been so much disused that they might, with great advantage, be turned to purposes of pisciculture?—My answer to that is this, why does one of the great railways in Scotland rent the Forth and Clyde Canal by its own side at 7½ per cent. on the cost. My other answer to that is, that a railway company with 30,000,000*l.* of capital has been allowed by Act of Parliament to give 100,000*l.* for a link of a canal, and destroy the whole line of communication over and over again in England.

2465. At this moment is it the fact that the Forth and Clyde Canal carries a very large traffic at all, to be compared to the traffic carried by railway?—It carries more than a million tons; I do not know what the railway carries by the side of it, but certainly not that.

2466. Is it not the case that the only great steamboat canal in this island is the Caledonian Canal, and that the Caledonian Canal had exceptional advantages, inasmuch as the greater part of its course was composed by nature of great deep locks, and that, notwithstanding that the canal has been a failure, and that ships prefer the sea carriage so much that they go round the North of Scotland in preference to using the Caledonian Canal?—Because it is not fit for it, because the lake navigation is so tremendously dangerous and exposed to such violent squalls, and with no anchorage, that the ships cannot venture by it; it is in reality perfectly ineffective; it was a grand mistake was the Caledonian Canal.

2467. Is there in these islands any other successful canal fit for steam navigation?—Not a single canal in England has been built for steam navigation; if anybody says to me, "Do you know a tramway with a locomotive working on it?" I should say, "No." "Why?" "Because tramways are not made for steam," that is all; but on the Forth and Clyde Canal, which was never built for steam, and has most essential defects, it is now extensively navigated by steam, even in spite of those defects.

2468. But it is the fact, is it not, that in England the general body of the canals have been superseded by railways?—Yes; canals totally inefficient and unfitted for the present state of traffic have been superseded by railways on which

Sir *George Campbell*—continued.

Lieut. Gen. Sir *A Cotton*, K.C.S.I.

27 June 1878.

30,000*l.* or 40,000*l.* a mile has been spent; if there was really a steamboat canal, 40 or 50 yards broad, made from London to Liverpool, the railways could not stand the competition a month.

2469. Have any great modern canals, of the character which you would wish to see, been made in France yet?—They are making a grand communication from Havre to Marseilles at this moment, at a cost of 8,000,000*l.*

2470. But it is not yet made, is it?—It is all open in the original state, but it is being improved; I do not know what length of it has yet been completed.

2471. Are there any other parts of Europe where there are any such canals?—There are canals all over Europe.

2472. I mean modern canals fit for steam navigation?—I do not remember any that really have yet been made fit for steam navigation.

2473. With the exception of the Erie Canal, which unites the great lake navigation to the ocean, are there any other great steamboat canals in America for long distances in effective operation?—Yes, there are many canals in America regularly worked by steam, and in Canada also.

2474. Could you mention the most successful of them?—I have got two large volumes of a Report of a Commission on the Water Carriage of America lately appointed, in which full reports of all of them are given, but I have not brought them with me to day.

2475. I understand you to have expressed the opinion that inland water communication is much cheaper than ocean communication; is that so?—Yes, for short distances; not for long distances of 10,000 miles.

2476. When you say short distances, would you say 1,000 miles?—Yes, for 1,000 miles it is much cheaper.

2477. Can you give us any instances in which for a distance of that kind for a traffic of several hundreds of miles inland water communication has triumphed over ocean communication?—No; I am not able to do so. If there was a steamboat canal from Calcutta to Madras, it would be much cheaper than sending the traffic by ship to Madras.

2478. What I want to know is whether you can point out to us any case in any part of the world in which an inland navigation has superseded, and has practically been proved to be cheaper and more profitable than an ocean navigation between similar points?—You see I am challenged to give an instance of the very thing that I am complaining has never been done. What I complain of is that steam has been applied to every thing in the world but inland water carriage. Then it is said, but where is there an instance of an effective steamboat canal, which is the very point that I am fighting for.

2479. I will take you to a project which we have just mentioned, the canal from Calcutta to Madras, and to Cape Comorin; that is a case in which you would propose to have inland communication which would be, as it were, parallel to ocean navigation, and which you think would be cheaper and more successful; what I want to ask you is this, what is the character of the traffic which you think might be carried by a canal of that kind, and without taking you to any case of a very long navigation, I take the instance which you yourself have given, the completion of the communication between Calcutta and

Lieut. Gen. Sir *A. Cotton*, K.C.S.I.

27 June 1878.

Sir *George Campbell*—continued.

Midnapore, so as in fact to complete the communication with Calcutta. I should like to know what is the goods traffic which would be likely to be carried in such enormous bulk by a canal of that kind?—The very traffic that is now carried on the Hidgeeley Canal which forms part of the line.

2480. I must correct you in that respect; the Hidgeeley Canal is not part of the line to Cuttack; it is the Midnapore line which is part of the projected line to Cuttack?—I beg your pardon; the Hidgeely Canal is most undoubtedly part of the line between Cuttack and Calcutta, and if the Hidgeely Canal was completed (80 miles) to the tidal creeks, navigation would now be open to Cuttack by that line.

2481. I must differ from you there, because I have seen the plans and proposals more recently than you have, and I have always understood that the proposal was that of the Midnapore Canal, which is quite different to the Hidgeeley Canal, and which it has been proposed to carry on to Cuttack; but, however that may be, the traffic upon the Hidgeeley Canal is local traffic; the whole of that produced in the Hidgeeley district is brought up to the port of Calcutta; supposing the canal was open to Cuttack, what goods traffic do you think there is likely to be between Cuttack and Calcutta of a bulky character?—The whole produce of the delta of Brahmanee and the Mahanuddy, would come by the lines that you have mentioned, the Hidgeeley tidal canal and the high level canal, as we called it, to Midnapore. They are two parallel lines, one going through the heart of the delta, and the other skirting the upper side of the delta, and they would both equally connect Cuttack with Calcutta.

2482. Of course, if they were both prolonged, but the whole question is of the produce of the deltas of the Mahanuddy and the Brahmanee coming up to Calcutta; are you aware that both the produce of Orissa and the produce of Bengal is generally in excess of the needs of the people, and that both those provinces habitually export rice?—Yes, I dare say they do.

2483. So that the surplus produce of Orissa is not consumed in Bengal, but is generally exported to Madras, the Mauritius, and other countries; are you aware of that?—Yes.

2484. Do you think it at all likely that, considering that the trade from Calcutta is an export trade, so long as there are the means of exporting the grain direct from the ports of Orissa, it would be taken up to Calcutta by a long inland navigation, and would there incur the expense of the port of Calcutta and the river Hoogly, and would be re-exported from Calcutta?—I am not theorising, I am simply stating facts. Here is a canal; that part of the way to Cuttack ends at nothing in the middle of the delta and carries 150,000 tons a year. How can I possibly question if the canal was put in communication with Cuttack and the whole delta, and the whole upper basin of the Mahanuddy, that there would not be much more than 150,000 tons carried along it; there can be no question about it.

2485. If it be a fact, as I assume it to be, that the surplus produce of Cuttack seeks an outlet to the ocean; if you look at the map, and see how much nearer the Orissa ports are as an outlet to the ocean, how can you suppose the grain to travel some 250 miles to Calcutta first, and then be exported from Calcutta?—I beg to say that I am not theorising; it is not my theory. I mention the fact, that 150,000 tons were carried last year by the Hidgeeley Canal from the heart of the delta, and that, therefore, we cannot but be certain that if that canal was continued into the body of the delta, and connected with the whole delta of the Mahanuddy and Brahmanee, that there would be much more carried than there is now, when it ends at nothing.

2486. Is there not some confusion in what you have told us about the delta; are you not aware that the Hidgeeley Canal drains a district which is part of the delta of the Ganges, and that it does not at all follow, because the produce goes to the Ganges delta, which is immediately adjoining Calcutta, that, therefore, the produce of the delta of the Mahanuddy, 250 miles distant, with an easy communication with the ocean much nearer, that that also should go to Calcutta?—I am quite certain of this; it is one single tract of country, although part of it is the delta of Mahanuddy, and part of the Brahmanee, and part of the Hooghly; it is all one tract of country, and if a canal going part of the way carries 150,000 tons 60 miles from Calcutta, if the whole 250 miles were completed, the traffic would be enormously increased. I cannot see how we can possibly come to any other conclusion than that. I am as certain that the traffic would instantly double, if that 80 miles was completed, as I am of anything.

2487. You are aware, are you not, that between Midnapore and Cuttack there are a large number of very large and heavy mountain torrents which cross the line of the proposed canal?—Yes.

2488. So that, consequently, the canal would be somewhat expensive in character from an engineering point of view?—Yes, it is estimated at 6,000*l.* a mile; a very expensive canal.

2489. Are you aware that the estimates for the other parts of that scheme have been very largely exceeded, and that it is not impossible that this estimate also will be exceeded?—Very likely, but they have got very good data now. They have carried it 70 miles from Calcutta towards Midnapore, and they have carried it 60 miles from Cuttack towards Calcutta; that is 130 miles, and it wants 120 miles of continuation of that same canal to Midnapore to complete it; and having the data of the first 60 miles, they cannot be much out in estimating the remaining 120 miles.

2490. Are you aware that that 120 miles is the most difficult part, crossing a great number of the largest streams?—They have already crossed the Brahmanee, by far the largest river there.

2491. You will admit that the probability of that canal paying would depend very much upon the assumption that the grain of Cuttack would go to Calcutta?—I think there will be an enormous traffic of various kinds of grain, and other things, along it, but I think it is not the best line of the two. I think the lower line, the Hidgeeley line, would be a line of greater traffic.

2492. About the Godavery traffic; I think Colonel Crofton told us that in reality the navigation returns from the Godavery canals are not large;

Sir *George Campbell*—continued.

large; is that so?—They are very small, because the toll is perfectly nominal. At first I never mentioned a word of toll; I was so afraid that they would put a toll on which would paralise the traffic, but at last they insisted upon it, and then the engineer who was then in charge proposed a plan by which, without meddling with the boats in *transitu*, which is the great point, they should merely put a license tax upon them, and that so small as to be quite nominal, in order that it should not interfere with the traffic.

2493. Then the advantage of those canals for the purposes of navigation is indirect, and not in the shape of direct revenue return?—Yes; I would like to add that as the irrigation pays over and over again the interest of all the expenditure, and as there is no wear and tear of the water in navigating the canal, of course the interest of the State is that these canals should be used to the utmost, and should be perfectly free.

2494. At present they are used entirely, or almost entirely, for the local traffic, are they not, for the transfer of the produce of those delta districts to the port of Cocanada?—Yes.

2495. Then about the Cauvery; on the Cauvery canals is there the same system of navigation?—We never made a system of navigation in Tanjore, which is a terrible defect.

2496. At this moment is there no canal navigation in Tanjore?—No; the river is navigated a little, but it is very imperfect navigation; that is the great advantage that the Godavery has over Tanjore.

2497. Except the Godavery canals, can you anywhere point to any successful canal now in operation in India as navigation canals?—I may perfectly safely point to the Hidgeeley Canal; that is quite a success; it has been open a very short time, and it has already 150,000 tons traversing the canal, though it ends in nothing.

2498. You are aware, are you not, that the Hidgeeley Canal is an old tidal canal which has been improved?—The present canal is entirely a new work.

2499. But it is an improvement of an old one?—No, it is entirely a new work.

2500. Are you not aware that there was a good deal of navigation there before?—Amongst the winding creeks, but the canal itself is quite new.

2501. And the Hidgeeley Canal is a canal executed in the delta of the Ganges?—Yes, it is between the Hooghly and the Brahmanee; which precise portion it belongs to I do not know.

2502. You are of opinion, are you not, that a great deal more may be done to improve the water communications of the delta of the Ganges?—Of course.

2503. And that the whole delta of the Ganges ought to be completely pervaded with a system of canal navigation?—Yes.

2504. You have alluded to the particular case of the communication between Calcutta and Goalundo, the point where the Ganges and the Bramapootra join, and I think you stated that the railway which now runs on that line does not carry more than one-tenth of the traffic?—That is what Mr. Leslie states.

2505. I will say a small portion of the traffic; but notwithstanding that, the railway pays?—Yes.

Sir *George Campbell*—continued.

Lieut. Gen. Sir *A. Cotton*, K.C.S.I.

27 June 1878.

2506. It is a fact that the other nine-tenths of the traffic, or whatever the proportion may be, is at this moment actually carried by water carriage, is it not?—Yes.

2507. So that there is existing water carriage of some kind?—Yes.

2508. You are aware, are you not, that a great part of the water traffic does in fact now come to Calcutta by the Eastern Canal and Tolly's Nullah, which is a somewhat rough and imperfect old canal?—Yes.

2509. And that that canal is exceedingly profitable to the Government, and that the only defect is that it is not sufficient to meet the existing wants of the navigation, and that on account of its tidal character and the occasional blocks in it it is not so effective as it might be?—It is only a little short bit. The main line of traffic between Goalundo and Calcutta is about 350 miles of tidal creeks. There is only a little part of it that goes by canal.

2510. You are aware that at present the canal does communicate with the tidal creeks, which afford good navigation, and that if that canal was only in good order, so far as boat traffic is concerned, there would be a very good water communication between Goalundo and Calcutta?—Not very good. I should say very bad. It is 420 miles round from Calcutta to Goalando by canal and the river navigation, and it is so bad that they are obliged to anchor every night, and they take six weeks to do it.

2511. When you say that there is 420 miles by river and canal from Calcutta to Goalundo, will you allow me to ask if you would refer us to any figures in support of that statement, because it is entirely contrary to my local experience?—It is all expressly stated in the minutes of the present Governor, and I could quote it if necessary, and also in a formal report made by the engineer on the Goalundo Railway Station.

2512. Are you not mireing the steamboat navigation which goes round by the Sunderbunds with the boat navigation which takes the direct route by the canal; do not you think that you are alluding to the steamboat route by the Sunderbunds?—I am speaking of the main communication between Goalundo and Calcutta for goods traffic.

2513. I quite admit that the steamboat traffic goes a very long way round, but what I want to bring you to is this: that we have a canal which brings boats by a route which is very tolerably direct?—The Bengal Administration Report for the year 1875-6 says this: "The attention of the Government of Bengal has been repeatedly drawn to the circuitous route which the river traffic between Calcutta and Eastern Bengal is obliged to take. Besides being circuitous, it is in some parts dangerous, especially in those parts which fall within the rivers Patta and Megna. Although some portion of the traffic is taken off by the Eastern Bengal Railway, still the greater portion follows the water highways, notwithstanding that these waterways are so tortuous as to be lengthened out to an excessive distance. It is calculated that a laden boat plying between Eastern Bengal and Calcutta travels some 200 or 300 miles more than it would if there were anything like a straight road by water. The obvious remedy will be to construct a canal for navigation across the country from

Lieut. Gen. Sir *A. Cotton*, K.C.S.I.

27 June 1878.

Sir *George Campbell*—continued.

Eastern Bengal to Calcutta," and so on. That is not what I say, it is what the Government of Bengal says.

2514. You have not got the original report from which this is taken; I observe that this is in inverted commas; is not this a quotation from a report of Colonel Haig, or some engineer officer?—I forget whom it is signed by; it is a quotation from a communication from the Government of Bengal to the Supreme Government.

2515. Does not the extract which you have just read say that the Bengal Government have been sincerely anxious to improve the defective character of the canal communication between Calcutta and the Eastern Districts?—I do not know about their anxiety, but I know that it has produced no result.

2516. And are you aware that they have had submitted to them repeated projects for the improvement of those communications?—Yes, that is exactly the point; we hear of any number of projects, and they call for any number of projects, but they will not do anything.

2517. Still you believe that that might be done?—Of course it might; it is the simplest thing in the world.

2518. I have not seen it myself, but I gather that you have yourself made a project of a canal to connect Calcutta with Goalundo; is that so?—Not with Goalundo, but with the main Ganges. My project was to carry a line of canal to the nearest point of the Ganges.

2519. To what point?—Somewhere about Cooshtea.

2520. May I ask you to explain the character of that project; was it to be a tidal canal, or how was it to be supplied with water?—It was to be a steamboat canal, with locks,; but since that, allow me to say there has been another greater project, and a far more complete one, planned by Colonel Rundall, for putting a weir across the Ganges at Rajmahal, and bringing a steamboat canal all the way from there to Calcutta.

2521. As I understand, that letter of Mr. Leslie's, to which you allude, has reference to a project for a canal to some of the Eastern Districts; is not that so?—That canal would serve both. It would drop the western traffic with the Goraee, and convey the eastern traffic on to Goalundo.

2522. It is proposed to carry that canal somewhere near Jessore?—The line that you have named was direct to Goalundo, and it would pass Jessore, and cross the Goraee, and at the Goraee it would drop the western traffic.

2523. How is it proposed to supply that canal with water?—By pumping.

2524. Then it was to be a high level canal supplied by pumping?—Yes. This was one point in my project about this line, that it is incomparably cheaper to make the canal above the water level, and pump the water into it, than to cut it down to the tidal water, and Mr. Leslie agrees with that.

Mr. *Fawcett*.

2525. Why is it cheaper?—If you have only to cut one yard deep, and make an embankment on each side, so as to give you eight or ten feet of water, of which six, we will say, are above the

Mr. *Fawcett*—continued.

level of the country, the excavation is a mere nothing; whereas if you have to cut down below the tidal water to get into the deep mud of the river, it is a very heavy and enormously expensive thing. You get into the semi-fluid mud of the delta, and then it becomes a very expensive undertaking. But five minutes calculation will show that to pump the water up eight or ten feet to the level of the canal, is a mere trifle compared with the additional expense of cutting a deep canal.

2526. How would you make the canal water-tight?—All the delta land is water-tight.

Sir *George Campbell*.

2527. Then I will ask you this: the plan is for a high level canal, and you are aware that that canal must cross a large number of great rivers?—Yes.

2528. You have yourself instanced the Goraee, how is it proposed to carry it across that great river?—Over the Goraee by an aqueduct.

2529. Is it to be carried over all the rivers by aqueducts?—There is no very large river except the Goraee on the line; there are several small ones, and the canal must be carried over them all by aqueducts.

2530. You are aware, are you not, that the Goraee is a river so large that to build the railway bridge over the Goraee was a very great and very difficult undertaking, and not effected without some misgiving as to the stability of the foundations and other difficulties; but there are several other rivers which are only small in comparison with the Goraee, but which, compared with the Thames, or any rivers which we know, would be considered enormous rivers, and this canal must be carried by aqueducts, must it not, over all those rivers?—Yes.

2531. Is it not the case that the expense of aqueducts to carry a large steamboat canal over those rivers would be enormous?—We are not in a position to go into detail; Mr. Leslie sketched out this plan, which is in his estimation quite feasible, and the Government called upon the engineers to examine, and investigate, and estimate the project; I have not seen their report.

2532. You are aware, are you not, that the great expense of the Ganges Canal was due to the enormous sum, I think a good deal more than a million sterling, that was expended on the aqueduct to carry that one canal over one very small hill stream, which is a mere drop in the ocean compared with the Goraee?—It would not cost anything like a million to carry an aqueduct over the Goraee.

2533. You are not aware that the Solani Aqueduct cost something like a million?—It perhaps cost a quarter of a million; the whole canal from Hurdwar to the plains only cost a million.

2534. At any rate that was one cause of difficulty?—The canal from Hurdwar to the plains, the whole line, including the Solani Aqueduct and several others of some 40 or 50 miles, cost a million.

2535. Still you are aware that the drainage encountered by the Ganges Canal in that little bit of country was a mere trifle compared to what this canal to Goalundo would encounter in the great

Sir *George Campbell*—continued.

great rivers of the delta?—No, I do not know that; on the contrary, there was an immense amount of drainage crossed by that canal.

2536. Now I will take you to the line of the Upper Godavery; have you yourself seen what is called the third barrier?—Yes, I have crossed there from Chanda to Seroncha. I know the country quite well.

2537. Did you come down the river the whole way?—I did not come down the third barrier; that is impossible.

2538. I mean, have you examined the river the whole way?—No, I know it by report. I have had Colonel Haig's report and estimate on the line, and I traversed the line by which he was bringing the canal.

2539. Are you aware that what is called the third barrier is in reality a tract of country of 50 or 60 miles in length, in the course of which the river descends several hundred feet?—I forget what the fall is, but all that was thoroughly examined and investigated, and estimated, by Colonel Haig.

2540. At all events, that third barrier could not be overcome, except by the canal going round that tract of country, with a lockage of several hundred feet?—I forget the exact amount. I think it was a descent of about 150 feet, or something of that sort, in about 30 miles, but that has all been estimated and examined.

2541. From the delta to the top of the country you yourself stated the total ascent to be about 1,100 feet?—Yes, up to the water-shed, between the Wurdah and the Poorna.

2542. You have yourself admitted, I think, that the present scheme for the navigation of the Godavery proposes only to get over the difficulties at certain points, but to trust to the river navigation for the greater part of the distance?—Yes.

2543. And that the river navigation is not available for, at all events, a good many months in the year?—No, not for about four to five months in the year.

2544. So that it would be a broken and imperfect navigation?—Yes, unless you supply it with water. It is like everything else. If you build nine arches of a bridge and leave the tenth unfinished, you cannot go along it. When I propose a project, instead of working according to the project, you leave out this and leave out that, and stop it in the middle, and then say, Look at your project.

2545. Have you yourself ever proposed any definite project for supplying the Godavery with water, so as to make it navigable all the year round?—I do not know that I have ever made any special report upon it, but so far as a line of that kind can be calculated for, the plans and estimates are all completed for it.

2546. Have you yourself ascertained it to be practicable?—I am perfectly satisfied with the reports that I have seen for making large reservoirs up in the upper part of Nagpore.

2547. You have told us that the Godavery is an enormous river, which at a certain season of the year carries an enormous quantity of water?—Yes.

2548. And at other seasons of the year it is so dry that it can be easily waded over, is it not?—Yes.

Sir *George Campbell*—continued.

Lieut. Gen. Sir *A. Cotton*, K.C.S.I.

27 June 1878.

2549. Granted that for a still water canal it may not be beyond engineering skill to store up sufficient water to make the canal available for navigation, is it not the case that to apply such an amount of water as would make that great river channel navigable at all seasons of the year would require an enormous quantity of water?—No, that has all been calculated. We know just as well as we know how much water it would take to fill a bucket. The river in the shallowest place is now a foot deep when it is the dry season, and we know exactly how much it carries when it is three feet deep, and that is the difference in quantity to be supplied for so many months, and that is the quantity that we want; we have abundant data now for knowing what it would cost to store the water in large reservoirs on the upper part of the district. It is all a mere matter of calculation, as simple as possible.

2550. Is it not the fact that the Godavery channel being a very large and irregular channel, involving a very considerable stream, the supply of water to render that channel navigable must be far greater than any that is supplied to any existing channel?—Of course it is enormously greater.

2551. May I ask who has made the plans and estimates, and calculated for the reservoirs which would contain the supply of such an enormous quantity of water?—That has all been planned and estimated, and the reports have been before the Government for years.

2552. By whom?—I do not recollect the name of the officer who planned the large tanks, but they have been before the Government for years.

2553. You will excuse me for saying that I have had before me the reports made by officers of the Madras Engineers, but I do not think that they have ever gone the length of making plans sufficient to supply the Godavery with water; could you give us any indication where those reports are to be found, or who the officers are?—There is an officer in England now, Colonel Fisher, who knows all about them, and he can tell you all about the reports and the estimates.

2554. Has Colonel Fisher examined the upper stream of the Godavery?—The place where they propose to make those large reservoirs are the feeders of the Weingunga, which falls into the Wurdah, and so into the Godavery. I think Colonel Fisher examined them personally, and he knows all about it. When that water is passed down, and has given a navigation of 500 miles of the Godavery, it will be worth 10 times what it has cost to supply the delta of the Godavery in the dry season.

2555. For navigation purposes?—Both for navigation and for irrigation.

Chairman.

2556. You have told us that a great many things have been estimated as regards this navigation of the Godavery, but so far as we have gone, all the estimates that have hitherto been made, as regards cost, have been utterly erroneous?—Of course they have; how could they be otherwise. An officer sends in an estimate (not an estimate by-the-bye, for I believe that the first mention of it was merely a rough guess) in 1853, and the works that have been hanging on,

Lieut. Gen. Sir *A. Cotton*, K.C.S.I.

27 June 1878.

Chairman—continued.

a bit done this year, stopped next year, gone on again next year, and so on, till the value of money is one-third of what it was. How can an engineer be responsible for that?

2557. Still that would not affect the cost of finishing their work now; there may have been a rise in the prices, but as we have got to deal with present prices, the cost of the canal would be correspondingly increased?—The works have been almost completed for 700,000*l.* working up to within a few years; that is a positive proof that if 300,000*l.* had been given in 1853, 25 years ago, it would have been amply sufficient to have completed the work. The excess of estimate is, of course, charged to us, because those who have done it are their own judges, and they say such a charge and such an estimate was exceeded.

2558. Was not the original estimate made by Colonel Haig, 80,000*l.*?—I do not remember. I think I myself, or my brother, stated roughly that probably 300,000*l.* would do it, before any estimate was made, and now we have positive proof that it would have been amply sufficient if the works had been carried out with ordinary energy; that is to say, if 50,000*l.* or 60,000*l.* a year had been given to them.

2559. In a report which was sent home to the India Office by the Indian Government, which I assume was correct, it is stated that Colonel Haig's first estimate was 80,000*l.*, and that it was sent back to him, and, upon revision, he adhered to his estimate of 80,000*l.*; are you aware of that?—I do not know that.

2560. You never heard of that report?—No. Very probably it was for the first barrier.

Sir *George Campbell.*

2561. When you say that the thing has been nearly completed for 7000,00*l.*, do you mean that the second barrier has been nearly completed?—Yes.

2562. Is it not a fact that by far the most difficult work, namely, the third barrier, has not been touched?—Yes; but when the second barrier was completed, it was a complete work; that is to say, access was given to about 5,000,000 of people occupying a populous and fertile country.

2563. Excuse me; where are those 5,000,000 of people, and where is the populous and fertile country, for I was about to ask you, is it not the case that the second barrier leads through an almost uninhabited and deserted country, little more than a jungle?—It is quite the contrary; it is an exceedingly fertile, populous, and thriving country on the right bank of the Godavery from the second barrier. They have 100 miles of river navigation above the second barrier, and all that is through one of the very finest and most fertile, populous, and thriving countries in India.

2564. Will you be so good as to say in which district that country is?—It is chiefly Hyderabad; almost all in fact.

2565. You are aware, are you not, that the British side of he river, at all events, is anything but prosperous and populous?—Yes; up to the Wurdah it is a very thinly populated country.

2566. Then coming toward the third barrier, it is, is it not, the case that it is thinly populated

Sir *George Campbell*—continued.

on both sides of the river?—Yes, it is up to near Hinganghat.

2567. As far as British territory is concerned, you will not tap the populous and fertile country until you have surmounted the third barrier, which has not yet been touched?—No; then with the third barrier you get to the coal and oil seeds, and teak, and all the produce of the Central Provinces.

2568. At the present moment is there any boat traffic on the Godavery above the second barrier?—I have not heard for three or four years, but the last I heard was that there were 24,000 tons of traffic; somebody said 24,000*l.*, but it was not so, it was 24,000 tons of traffic up the river at that time. I do not know whether it has increased now or not; I have not heard.

2569. Supposing that the Godavery could be canalised up into the Central Provinces, and a sufficient supply of water to make it a really efficient means of water navigation should be produced, I should like to go back to the question which was mooted when you were last under examination as to the traffic which would be carried upon that canalised river. Do you seriously mean to express the opinion that the coal of Chanda would be likely to compete successfully, say in the market of Madras by that route, with the coal of a superior quality which exists in enormous abundance within 100 miles of Calcutta, which coal mines are connected with Calcutta by double lines of railway, which, if it was necessary, might, without much difficulty, be connected by a canal; do you seriously think that in the market at Madras the Chanda coal could successfully compete by that route with coal brought by sea from Calcutta?—There would not be the slightest chance of competition on the part of the Calcutta coal; Madras would inevitably be supplied with coal from Chanda, and so would Coconada.

2570. Is it not a fact that, as a mere matter of distance, Calcutta is almost as near as Chanda to Madras?—There is not much difference; I think Calcutta is about 1,100 miles from Madras, and the other is about 700; but there would be no chance between the two.

2571. Although there is fine sea communication between Calcutta and Madras?—The mere expense of getting a ship out of the river in Calcutta would be more than the whole cost of carrying the coal from Chanda to Madras by canal.

2572. Does not that altogether depend upon the event that internal water communication can be made cheaper than sea communication?—Yes.

2573. Then beyond the coal what else do you think is likely to be carried?—What would be brought down would be cotton, coal, oil seed, timber, and wheat, and other produce; and what would be taken up especially would be an enormous quantity of salt. If that water navigation was opened, at least 10 millions of people would be supplied with salt from the Godavery district. May I add that when we went up the Godavery the first time we went up in a steamer, and we called at different villages to show the people the steamer. At every one of those villages the first thing they said to us was, "But will you bring us salt?" There is no doubt that

to

Sir *George Campbell*—continued.

to get salt cheap is a great desideratum for the people up in Central India.

2574. Are you aware that at present Bombay salt is brought at a very cheap rate by railway?—It costs a penny a pound in Nagpore.

2575. Are you aware that by far the greater part of that cost is the Government tax?—Yes.

2576. Which would be imposed whether it came by water or whether it came by land?—Yes.

2577. Are you prepared to give it as your opinion that the cotton of the Central Provinces would be taken to Coconada rather than by rail to Bombay?—Yes.

2578. Do not you think that so expensive an article as pressed cotton will bear railway transit?—It would bear it; but it would, of course, go by the cheapest line.

2579. In England do you think there is any cotton now carried by canal in preference to the railway?—Not only cotton, but manufactured goods; and I have heard a manufacturer of Manchester himself, when somebody said, "Why do you carry manufactured goods by canal from Manchester to Liverpool, why do you not carry it by railway?" say, "Because it is preferable."

2580. Is it the case that a large proportion of the manufactured goods of Manchester goes to Liverpool by canal?—Yes, an immense quantity.

2581. I think there must have been some mistake in your evidence when you said the cost of carrying cotton from the Central Provinces to Bombay by railway was 2*s.* 2*d.* per ton per mile?—No, it is 2½*d.*

2582. I understood you to say that it was an entire mistake to say that there were mountains on the West Coast of India; is not it the case that all the way from Surat to Beypore there is a wall of considerable mountains known as the Western Ghâts?—That was not the line we were talking about. The line from Bombay to Karwar is an impracticable line. It was the line from Karwar to Cape Comorin we were talking about.

2583. Is it not the case that between the coast and the interior the whole distance from Surat to Beypore is a chain of mountains known as the Western Ghâts, which are without any break, and which it would not be possible to traverse by any canal without locking it up 2,000 feet high?—You ascend 2,000 feet, but there is a complete breach in the line of ghâts by the line of the Kala Nuddee, which flows from near Dharwar to Karwar.

2584. What is the lowest point in that breach?—About 2,000 feet, I think.

2585. There is no part lower than 2,000 feet, is there?—No, not there.

2586. With regard to those main lines of canals, you believe that those enormous reservoirs might be constructed by which even such great rivers as the Godavery might be rendered navigable in the dry season; in any part of the world do reservoirs on that enormous scale yet exist?—In Bombay they have two actually constructed now. One of the two on the line near Sholapore would go far towards, I am not sure that it would not quite keep, the Bhima navigable all the year.

2587. Are not those tanks devoted to a comparatively small irrigation system?—They only use a small part of the water; but I am not speaking about the use made of them now, but what use could be made of them in the way of navigation.

Sir *George Campbell*—continued.

Lieut. Gen. Sir *A. Cotton*, K.C.S.I.

27 June 1878.

2588. At present does there exist in any part of the world, in actual practice, a storage of this kind, which is sufficient to supply a great navigation?—There have been great reservoirs constructed in various parts of the world.

2589. I mean on so large a scale as you propose?—Not so large, I think. I did not propose them; but they were proposed for Nagpore to contain 2,000,000,000 cubic yards of water; but there are some enormous ones in France constructed, not for purposes of navigation, but to prevent floods.

2590. What are those main lines of navigation which you think might be established?—From Calcutta to Kurrachee, up the Valley of the Ganges, across the watershed of the Jumna and the Sutlej, and down the Valley of the Indus to Kurrachee, that is one; and the worst part of it is now actually cut, the Sirhind Canal, across from the Sutlej to the Jumna. The second is by the line of the Godavery and the Taptee from Cocanada to Surat. The first one crosses the country at about 1,100 feet above the sea, and the second one at about the same level; then the third, up the Valley of the Toombuddra and the Valley of Kala Nuddee, crossing the watershed near Darwar, which is the worst one, 2,000 feet, reaching the sea at Karwar. The fourth is by Palghaut, a breach south of the Neilgherries, going up the Valley of the Ponany and down the Valley of the Ambravatty, crossing the watershed near Coimbatore, on a level of about 1,400 feet. Then the two coast lines of course meet at Cape Comorni.

2591. Take the line from Calcutta to Kurrachee; you would have to begin with a great canal from Calcutta to Rajmahal, which would be a very expensive undertaking?—Yes.

2592. Do you know the height of Rajmahal above Calcutta?—It is about 100 feet, I should think.

2593. Then from Rajmahal what line would you take?—I would carry it on to Monghyr along nearly parallel with the river, where it would meet the Soane Canals.

2594. Are you aware that that would be an undertaking of very great engineering difficulty?—No; I have seen it, and I have examined the line. There is one place where it would go round the end of the hills, where there is a little bit of tunnel on the railway.

2595. Are you aware that it has been extremely difficult to maintain the line of the East India Railway, that the Ganges has repeatedly threatened to wash away, and has washed away, parts of it?—It is easily protected.

2596. Has any estimate been made for that part of the plan?—No, not that I am aware of.

2597. Then crossing the lines of the Soane project, are any fitted for steam navigation?—So far as they have been allowed to be executed, but, like everything else, they have been stopped, and stopped, and stopped, and nothing carried out.

2598. Then the lines of the Soane are not fitted for steamers?—Yes, so far as they have been carried, they are fitted for steamers of 250 tons.

Lieut. Gen. Sir *A. Cotton*, K.C.S.I.

27 June 1878.

Sir *George Campbell*—continued.

tons. You can go now from near Chunar, on the Ganges, about, I think, 150 miles, to Patna by steamboat canal.

2599. Then the project has been that the Soane Canal should be carried westward as far as the River Kurramnassa; how would you get from the Kurramnassa to Allahabad?—I have examined that line, and it is a perfectly practicable line.

2600. It does present very great engineering difficulties, does it not?—No, not at all.

2601. Has it been estimated?—I do not think it has; I do not know. I have been along it, and I know that it is a perfectly practicable line.

2602. Then you would use the Ganges Canal and the Sirhind Canal?—The navigation would go by the Lower Ganges and the Ganges Canals, which would be connected at Cawnpoor. That would involve an acqueduct across the Jumna at Allahabad.

2603. I suppose you do not doubt that it would cost many millions of money?—No, nothing like it.

2604. Do you know what the lattice railway bridge has cost?—No, I do not.

2605. Are you aware that it cost at least half a million?—I never heard; it ought not to have cost that.

2606. At all events the railway bridge over the Jumna, although it is a mere iron lattice bridge, has cost a sum something very much larger than almost any one bridge that we have any knowledge of?—I do not know what it cost; I only know that the thing is quite practicable within a moderate expense.

2607. Have you ever made an estimate for making an acqueduct for the canal across the Jumna?—We have an acqueduct on the Godavery across the sandy bed of the river, just about the same width as the Jumna, which is now traversed by the navigation. It is 30 feet broad, and cost 30,000 *l.*

2608. No doubt it would involve a large expenditure of money to make the Ganges Canal fit for steam navigation, would it not?—The Ganges Canal is practicable for steam navigation at this moment I have no doubt, but it might be greatly improved.

2609. Must not all the bridges be removed?—No, they have been all altered.

2610. To the extent of making them fit for large steam navigation?—Yes, quite.

2611. And is the Sirhind Canal already fitted for steam navigation?—Yes, that is a canal which could carry steamers, it being 110 yards broad.

2612. From Loodiana to Kurrachee nothing whatever has been done in the way of a canal, has there?—Nothing at all.

2613. Several large rivers would probably have to be crossed?—Yes.

2614. And no estimate has been made for that line?—No.

2615. No doubt that a great undertaking of that kind would cost a very large sum?—Yes, but then we have cut thousands of miles on that line, and therefore we have ample data. We have cut, or are cutting, about 700 miles of steamboat canal between Calcutta and Loodiana.

2616. Is it not the case that the existing canals have been designed to go over the easiest ground, and that the most difficult ground by far

Sir *George Campbell*—continued.

remains untouched, and even unestimated for?—No, that is not the case.

2617. Now to come to the subject of irrigation; Colonel Crofton told us, as a matter of reference to the official records, that those records showed that at the time when we took over the country of Tanjore, the irrigation was as much as 700,000 acres, and you have told us that it is now 740,000 acres; I understood you to have said, nevertheless, that from some calculation which you made with reference to the amount of revenue received, you supposed that 40 years ago the Tanjore irrigation was not nearly so large as had been supposed; I want to know whether you are prepared to contradict the definite statement which Colonel Crofton has made to us as coming from official returns, of the time when we took over that country, that the extent of the irrigation was actually as much as 700,000 acres, and consequently not much less than it now is?—Yes; my reply to that is, that there are the Government statements, that is all. There is the actual wet assessment, as we call it, of the Government lands at the time when we began the works in Tanjore, and they show, I think it is, 420,000 acres irrigated of Government land. There was a little more of zemindary land besides; perhaps 500,000 acres altogether. That is an actual Government return.

2618. I understood you, in your last day's evidence, to say, not that the Government returns showed an irrigation of 420,000 acres, but that the Government returns showed a certain revenue, which you, calculating it at the rate of 5¼ rupees an acre, deduced as showing that there could only have been 420,000 acres of cultivation?—We stated it accurately at the average wet assessment 5¼ rupees. There is no mistake about it.

2619. You think that Colonel Crofton was wrong in stating that it was 700,000 acres?—Yes. I know the district better than Colonel Crofton, and there is the actual statement in the Government return.

2620. Can you put in that statement to which you refer?—I have given it in my evidence last time. All the figures are given.

2621. Then it comes to this, that you think Colonel Crofton is wrong?—You cannot imagine how curious all this is to me. If you were to go and ask a native, "Has there been any increase of irrigation since the anicuts were built," he would laugh in your face.

2622. What I find you said was this: the assessment you say, in 1832, was 2,380,000 rupees, which, at an average of 5¼ rupees per acre, gives 420,000 acres; you did not state the records anywhere showed that it was 420,000 acres, but you deduced that from the amount of revenue?—But that is perfectly well known. It is recorded in 50 places. I could show it you in the last Madras Administration Report.

2623. What is the present rate of assessment?—Five and a half rupees is the average tax on irrigated land. The average tax on dry land is a rupee and a half.

2624. You are aware that, 40 years ago, the revenue was collected on a totally different system, namely, it was collected upon a proportion of the produce per acre?—Yes, but still the average was the same.

2625. Now, as regards the revenue, I think you

Sir *George Campbell*—continued.

you gave us to understand that there had been a very large increase in the revenue of the Tanjore district, and also of the Godavery district; you calculated it to be about 80 per cent., I think; what I want to understand is this, does that increase include all the sources of revenue, or only the land revenue?—All the sources.

2626. You are aware that in that period the salt tax has been very largely increased, and that other taxes have been increased, and the sources of revenue other than land cannot be directly attributed to the canals?—In a great measure they are, because the people have been enabled to pay them. It would be of no use having a salt tax, if the people had not been enabled to buy the salt.

2627. Can you tell us the exact amount of increase of land revenue in the Tanjore and Godavery districts?—No, I cannot at this moment, but I could easily get it. What I say is this as to the 20, the 26½, and the 91 per cent. return on the irrigation works, they are the actual increase from water rates, and do not include any increase from the improved condition of the people. Then I say here is a district, the revenue of which has increased by 350,000 *l.* Does not everybody in the world know that a great portion of the increase of revenue besides the water-rate is due entirely to the improved condition of the people.

2628. Still you admit that the whole of that 80 per cent. increase is not directly due to canals, because it does not directly come from canals, or from land watered by canals?—It is simply the increase of the water-rate.

2629. Can you say that the increase of the land revenue is more than 50 per cent.?—I do not recollect exactly what the increase of the land revenue is, but it could be found in the last Madras Administration Report.

Mr. *Sampson Lloyd.*

2630. Over how large a district was this 300,000 *l.* increase obtained?—There is an increase of revenue in the whole delta of the Cauvery of 400,000 *l.*, and in the whole delta of the Godavery, of about 330,000 *l.*

Mr. *Onslow.*

2631. Since what year?—Since we began the works; in Tanjore it is since 1836. The works have been gone on with all the time, and the increase of the revenue of the Kistna also has been 330,000 *l.*

Sir *George Campbell.*

2632. That increase is since the year 1830, is it not?—The Tanjore increase is.

2633. And it is about 80 per cent. upon the revenue of that time?—It is about 80 per cent. in Tanjore alone.

2634. Of which a large proportion comes from salt and other sources?—Yes.

2635. You have of course looked at the returns of the Indian revenue; are you not aware that the general revenue of India has in that period more than doubled?—Yes, no doubt it has.

2636. So that the increase in the Tanjore district is not really larger in proportion than the

Sir *George Campbell*—continued.

Lieut. Gen. Sir *A. Cotton*, K.C.S.I.

27 June 1878.

increase of the whole revenue of India?—No. There has been a great increase of the revenue of India by the annexation of Oude, and many other territories.

2637. But are you aware that in that period the price of grain throughout India has probably at least doubled?—It has greatly increased.

2638. And that in those days the Madras land revenue was calculated upon the price of grain?—It was in Tanjore; not everywhere.

2639. And that therefore by a natural process the revenue would naturally be doubled by the increase in the price of grain?—No.

2640. Why not?—Because that is not the way that it has been carried out at all. The irrigated land in Tanjore pays exactly the same revenue now that it did 40 years ago; that is to say, the assessment per acre is the same as it was 40 years ago.

2641. Then there could not be any increase of the land revenue except by an increase of cultivation?—Except by either an increase of cultivation, or an increase of irrigation; in no other way.

2642. Then if the inspector general of irrigation, in stating that the old irrigated area was nearly as large as at present, is right; there would be no increase of land revenue at all?—No, none at all.

2643. Is not it possible that the irrigation, which was in a flourishing state when we first took the country, fell off afterwards, owing to the works falling into disrepair, was restored to its present state by the engineers, and is it not possible that the discrepancy between Colonel Crofton's official statement and yours may be reconciled in that way?—No. When I took charge of the Tanjore district there was no great falling off. People were terribly afraid of a great falling off, but there had no great falling off taken place at that time. On the contrary, it had continually increased under our improvements. There was a considerable improvement in Tanjore before I took charge of it.

2644. Then, as I understand, the result of your statement is, that so far as direct profit in the shape of revenue goes, there has been no increase of the land revenue per acre in consequence of the improvements which we have made to the Cauvery irrigation, but that the improvement which you claim is due to the increase of irrigation which you claim, and so far contradicting the statement of Colonel Crofton?—The increase has been due to the greatly increased area of irrigation from which the Government have received the water-rate; that is the main cause of it, and that is the only thing which is carried to account in the Government statement.

2645. Now I will take you to Bengal, and to the comparison which you made between Bengal and Madras; I suppose you are aware that, for the purposes of that comparison, you selected the district of Bengal which had been devastated by fever for several years, which was then in consequence in a very reduced state, and presented an unusually unfavourable picture, and which can hardly be taken as an average picture of the ordinary state of Bengal?—It in a great measure represents the state of a very large portion of the Bengal Presidency.

2646. And I think that the statements upon that subject which you submitted to the Com-

Lieut. Gen. Sir *A. Cotton*, K.C.S.I.

27 June 1878.

Sir *George Campbell*—continued.

mittee were entirely taken from the report of Colonel Haig, were they not?—And of Mr. Saunders, the medical inspector.

2647. You are aware that although Colonel Haig is a very admirable officer of the Madras Engineers, who I think was at one time your assistant on the Godavery works, and an extremely able and conscientious man, he had no previous acquaintance with Bengal, that he was entirely ignorant of the Bengalee language, and that we can hardly accept his view of the social condition of Bengal as in itself and alone sufficient to supersede all other reports of people who have a greater knowledge of the country and the language?—I never saw any accounts of Bengal that contradicted his, and I have seen many.

2648. Then are you also aware that the complaint with regard to the Burdwan and Hooghly district was not that it had too little water, but that it had too much?—Both, that there was too much at one time of the year, and too little at another.

2649. I think Colonel Haig and Mr. Saunders entirely attributed the unhealthiness, although they attributed it to the question of water, to excess of water and not to deficiency?—No; a great portion of the sickness, he says, is due to their not having wholesome drinking water in the dry season.

2650. I think you stated that nothing was done in consequence of those reports?—No.

2651. Are you aware that notwithstanding that the sickness has disappeared?—I did not know that; I had not heard of it.

2652. Has your attention been drawn to a paragraph which went the round of the newspapers the other day, extracted from the official reports, showing that during the recent Madras famine those very districts of Hooghly and Burdwan had produced an enormous surplus of grain, that they were in a state of most exceptional prosperity, and that the surplus grain ready for export was so great that the railway could not carry it away?—No. This is what is described as the state of things as late as December 1877: "While fever is so prevalent in Calcutta, it seems also to be raging with some severity in many parts of the province. A correspondent draws a sad picture of the state of several villages not far from the metropolis, specifying Mitahari, Sharalia, and Sen'azgati. Fever, he says, has been raging there with the violence of an epidemic for a year and a half. He gives no statement of the mortality, but represents the people as quite heartless and hopeless. The native Kobirajes are baffled by the fever, and quinine, he says, is ineffectual. In their distress the villagers are turning despairing eyes to the Government, wondering why a beneficent Râj does not send them medical aid. Another correspondent informs us that Halishahar has been suffering severely from epidemic fever since the middle of October. Application has been made by the inhabitants to the subdivisional officer to move the proper authorities to send temporarily a medical officer and a supply of medicines to the place," and so on.

2653. That is certainly so; but I come back to my question: Are you aware that the Burdwan and Hooghly districts have recovered by the mere natural advance of the wave of fever into other districts, and that they have lately been

Sir *George Campbell*—continued.

supplying an immense surplus produce of grain which has been utilised for the benefit of the famine in the Madras districts?—Yes, I daresay they have.

2654. Are you aware that Hooghly and Burdwan are the most populous and most crowded districts of Bengal, and probably those which, in regard to the revenue system, show the least favourably, and you will admit that there may be districts in East Bengal and elsewhere which may contrast not unfavourably with those of Madras?—No account that I have gives the slightest ground for supposing that it is a thriving population in Hooghly, but they are in a most miserable state. Every account that I have ever seen agrees with Colonel Haig and Mr. Saunders in that.

2655. Have you not also seen reports from which it may be drawn that in some districts of Eastern Bengal, where they are not so crowded, the population is really very prosperous and very well-to-do at the present moment?—I daresay there may be such a population.

2656. Have you not seen some extracts from statements of the present Lieutenant Governor of Bengal, commenting upon the extreme prosperity of these districts of Eastern Bengal?—I have not.

2657. You will admit that there may be local circumstances which may affect one district, and not affect another?—Yes; and therefore I say, why were not the works executed that would correct those evils?

2658. I suppose you will also admit this, that it is not a necessary consequence of the fact that fever exists in some parts of Bengal, that irrigation works should be introduced into those parts of the country; that is to say, although your opinion may be that fever would be cured by irrigation works, yet it is not a thing which follows of itself as a logical and necessary consequence?—I only give my opinion, based upon Colonel Haig and Mr. Saunders' opinion, that is all.

2659. That is an evil which you believe would be cured by irrigation, but you cannot say that there is anything about it by which it can be proved logically that irrigation would necessarily cure that fever?—No; but that is the opinion of Colonel Haig, Mr. Saunders, and myself, and we have had great experience.

2660. I will take now the Bengal district of Midnapore, in which irrigation has been introduced with some success; you are aware, are you not, that the supply of water for the Midnapore Canal has been found to be extremely limited, and that in the dry seasons it has failed?—Yes, because they would not execute the works, and then we are charged with the want of water.

2661. What were those works?—Works for storing the water up the river; that is exactly the way that everything is done; all our works are spoilt, and then they turn round upon us and say, Look and see how your projects have failed, and how the estimates have been exceeded; and I say, Whose fault is it?

2662. What is your authority for saying that in this present year 270,000 acres have been watered by the Soane Canal, because I find that in the last telegraph which has come from India purporting to contain an extract from the "Gazette,"

Sir *George Campbell*—continued.

"Gazette," it says, "The last 'Gazette' contains an important report on the irrigation works in Bengal for 1876-7;" "there is a considerable decrease in the area irrigated, which was 116,074 acres in 1875-6, but has fallen to 98,802 in 1876-7; this is attributable to the falling off in the areas on the Miduapore and Soane Canals area; the Orissa system shows a marked increase." What I want to know is, where you get the figures from which it appears that notwithstanding that in 1876-7 the total irrigation in Bengal had fallen off and was only 98,802 acres, at present there is irrigation upon the Soane of 276.000 acres?—The Governor of Bengal stated last September that there were 200,000 acres irrigated upon the Soane, and a private letter which I have received since then stated that the extent of irrigation was 270,000 acres before the end of the year.

2663. Did he say so last September?—Yes.

2664. Did he say that they were irrigated, or that they would be irrigated?—That they were irrigated.

Mr. *Fawcett.*

2665. Have you got his speech?—Yes. He says, in November 1877, in the speech which he made upon the Soane Works, "It also seemed to me fair, and I believe you will agree with me, if you will give the subject your unprejudiced consideration, that a share of the cost should fall on the people who directly benefit by the introduction of water to the neighbourhood of their fields, and are thus assured of a good crop at all seasons, instead of being exposed to the risk every few years of absolute failure. When I proposed this I was told that the people did not want water; that they would sooner be left alone to bear the risk of famine; and I was even told that the water of the Soane was destructive to fields. Shortly after this discussion took place, the periodical rains were suspended, and then we had practical proof as to whether or not the Soane water was considered injurious or prejudicial. The people clamoured for water, and to meet this demand we were forced to open our unfinished canals, by means of which we have irrigated during the last few months 200,000 acres of land, which would otherwise have remained waste for the year, but which are now covered with luxuriant crops. The produce of this land represents food grain of the value of 50 lakhs of rupees, and of this crops to the value of 40 lakhs certainly would have been entirely lost if it had not been for the supply of canal water, but it also represents the rent of the land, of which the landholder would have been otherwise deprived; and to this must be added the outlay which would fall on him if he had again to give relief to his tenantry in consequence of famine. I have just returned from visiting the part of the country where the system has been introduced. I saw, what every one admitted to be, the finest crops ever seen in Behar in the irrigated fields, while the unirrigated fields by their side were parched and had hardly a blade of vegetation in them. I drove for 60 miles through the irrigated tracts, and returned by one of the main canals. Nothing but this ocular demonstration could have convinced me of the enormous benefits which have been conferred upon the people by irrigation; and throughout the only complaints which I received from the people with whom I conversed, were of the non-extension of the water supply to their villages."

Sir *George Campbell.*

2666. This was a speech made by Mr. Eden, when he proposed to introduce a compulsory water cess upon the land, was it not?—No, that was not the subject of discussion at the time.

2667. I think the passage which you have read did distinctly refer to that?—He said it would be but fair that they should pay a part of it.

2668. There was a proposal to introduce a tax of that kind?—Yes.

2669. And that proposal has since been withdrawn?—Yes.

2670. Are you aware that this was the occasion on which, on account of the special failure of rain, the water was given gratis?—A great deal of it was, not half of it; I do not know what the extent was, but a large portion of it was paying.

2671. The greater part of this 200,000 acres was not paying, but the water was given gratis?—Not the greater part.

Mr. *Onslow.*

2672. There was nothing in that to prove that the natives would have taken the water if there had not been a scarcity?—No.

Sir *George Campbell.*

2673. Even if there was a scarcity in that year, they did not pay for it?—No, but the increase this year has been very great.

2674. Do you understand why, when there was a scarcity, they were not required to pay for the water?—I do not.

2675. I see you have contrasted the great advantage of river water in the way of manuring the land as compared to the deficiency of such qualities in rain water or well water; but is it not the case that almost the whole of the irrigation from the Ganges Canal and from other canals of Northern India is by means of cold weather irrigation, a supply of water which does not carry fertilising manure with it?—I have no doubt that they carry down a great deal of fertilising manure, though not so much as when the river is in flood.

2676-7. Are you aware that the cultivators complain that it does not carry down any fertilising manure at all, but according to their version it is less fertilising than well water?—I am not sufficiently acquainted with the circumstances of the case, but they have gone on watering for 20 or 30 years, and I suppose they would not do it if they found that it was not beneficial.

2678. Is not that the very ground of complaint that has been made, that, owing to their watering for a considerable period, the land has been exhausted, the water not having replaced what had been taken from the soil by exhaustion?—I do not think that cold weather water can possibly be so fertilising as flood water.

2679. It is the case, is it not, that the fertilising property of a number of rivers is only in the case of a river of a fertilising character when it is in flood, and when the water is drawn so directly from the river, and with so short a transit, that the silt is not deposited in the transit?—No; river water contains a large quantity of manure in chemical solution, and a large

Lieut. Gen. Sir *A. Cotton*, K.C.S.I.

27 June 1878.

Sir *George Campbell*—continued.

large quantity in suspension. What is in a state of solution is carried wherever the water goes, and some of what is in a state of suspension is deposited, but it deposits the least fertilising part of it; and the most fertilising part is carried on with it to the fields.

2680. Is it not the case that the part which is actually in solution, being of a saline character, has sometimes been found to be defertilising?—I know nothing of that; I never saw fresh water carry salt myself, and, therefore, I do not know.

2681. I think you alluded to the fact that the poor were dying of starvation in the district of Cawnpore?—Yes.

2682. Is not that a district in which the Ganges Canal is in full operation?—Yes, the Ganges Canal waters 800,000 acres, but that will not supply the whole population of the Doab.

2683. So that at present this district is not protected from famine and scarcity by the Ganges Canal?—Where the irrigation is they are protected; I do not say that it protects the districts which are not irrigated; there is only a small part of the Doab which is irrigated.

2684. I think you have quoted the petition of the Trichinopoly ryots?—Yes.

2685. Looking at the language of that petition, do you really believe that it was written by the Trichinopoly ryots, and not by a Madras lawyer?—I do not know I am sure; it is a memorial that was made in the name of and presented by the Trichinopoly ryots; and this I do know, that it is exactly the language of the Trichinopoly ryots, because I know them well enough; I know it is exactly what they would say to anybody that asked them about the matter.

2686. Do you really think the language used in that document is such as a Trichinopoly ryot would use?—It may be put in English words by somebody, but it is perfectly certain that it is the sentiment of the Trichinopoly ryots; I know enough of them for that.

2687. You have expressed your opinion that in tolerably favourable circumstances irrigation may be established at a cost of from 2 *l.* 10 *s.* to 3 *l.* 10 *s.* an acre, and you say that at 2½ rupees per acre upon the expenditure of 3 *l.* 10 *s.* per acre, the return would be 8 per cent.?—Yes.

2688. Must not all the expenses for maintenance and establishments, and one thing and another, be deducted from that 8 per cent.?—Yes, 3 per cent. abundantly covers all the expenses connected with irrigation.

2689. Then that will reduce the return to about 5 per cent.?—Yes.

2690. Then that 5 per cent. will depend, first, upon your completing your irrigation schemes at a cost not exceeding 2 *l.* 10 *s.* or 3 *l.* 10 *s.* per acre; and secondly, upon the whole of the land covered by your irrigation canals being taken up for irrigation, and the ryots of the whole of that land accepting the irrigation; and thirdly, upon their being willing to pay 2½ rupees per acre, good years and bad together, for the supply of the water?—Yes; it also supposes that the people will pay in that case one-eighth or one-tenth of what they are now paying for irrigating by wells. One of the witnesses stated that the expense of well irrigation was 30 rupees an acre; and Mr. Robertson states that, in Coimbatore, the expense of well irrigation is 20 rupees an acre, and

Sir *George Campbell*—continued.

therefore all that they pay is one-eighth or one-tenth of what they now pay for bad water from wells.

2691. Still you are aware that there are some districts in India which have not been willing to pay the 2½ rupees to produce 5 per cent.?—I am quite sure they would be extremely unwilling to pay half a rupee if they could possibly, by any means, evade it. They will tell all the stories in the world to the revenue officer, and complain most bitterly of the engineer, or do anything to try and find a way of evading paying altogether. In England, too, people would very much rather not pay the income tax than pay it if they could help it.

2692. Still there are districts in which they would rather refuse the water than pay even one rupee per acre?—Under some peculiar and extraordinary circumstances.

2693. Will you just point out generally what are the parts of India which you think are now most favourable to the extension of irrigation?—There is an enormous proportion of all India. There is all the Punjab, and all the remaining portion of the North West, almost all of Oudh, all Rohilkund, all Bengal, all the delta country, and all the plains of the Kistna and the Toombuddra, and the vast extent of the Carnatic still unirrigated, many hundred millions of acres perfectly fit for irrigation.

2694. Still you will admit that it is more likely to be favourably regarded in some parts of the country than others?—Yes; you must examine every individual project of course.

2695. So that your calculation that people will be willing to pay 2½ rupees per acre would not apply to all districts?—No; but 2½ rupees is so extremely low that I am quite sure that there is no part of India where it would not be worth while their paying that. The charge on the Toombuddra is 6 rupees per acre.

Mr. *Ernest Noel.*

2696. In well irrigation the sole cost to the ryot is his own labour, is it not?—And his bullock labour.

2697. But would not he give that labour when he would be otherwise doing nothing, and therefore it becomes practically no cost to him?—The principal part of the demand for water is in the very height of the cultivating season when labour is wanted for every purpose.

2698. You gave an estimate of 3,000 *l.* a mile for making a canal; would that be for a steamboat canal?—Yes.

2699. Because a steamboat canal is very much more costly, is it not, than one on which steam is not going to be used?—Yes; I am speaking of first class canals fitted for the immense traffic of India, which must necessarily be large enough for a steamer.

2700. Would you not have to protect the banks in some way from the wash of the steamer?—You would either have to slope the banks or to line them with stone. In the very large canals, such as the Sirhind Canal, 110 yards broad, the wash is a mere nothing. I would like to add one more remark to that, namely, that the great mass of the traffic going at the very low speed that it would necessarily do, there would be no wash at all.

2701. In

Mr. *Ernest Noel*—continued.

2701. In England the objection to canal traffic is the slowness of carriage?—I suppose you consider that in India time is not so important as in countries like England or France?—Time is, of course, a very secondary thing in a poor country compared to what it is in a wealthy one; but when I see, I do not know how many lines of navigation in England, with a million and more tons on it, it shows that there is a large portion of traffic to which time is of very little consequence indeed. Only think of nine-tenths of the traffic from Goalundo to Calcutta taking six weeks, carried on by European merchants, while it can be brought by railway in a day; that is a proof what the value of time is in the great mass of the traffic.

Mr. *Childers*.

2702. Have you formed a complete scheme for navigation and irrigation canals for the whole of India, which you would recommend that the Government should carry out over a series of years?—As to navigation canals, I have a complete scheme of the main lines in my head; as for the irrigation plans, they would require to be examined in detail.

2703. But could you give the Committee approximately the extent of the scheme which you have either in your head, or which you have prepared on paper?—The first thing of all that I would do would be to give about 10,000 miles of main line navigation, which I reckon would cost about 30,000,000 *l.*

2704. You would first of all take 10,000 miles of main navigation; then do you add to that any lateral navigation?—That might be carried out to any extent afterwards.

2705. But in proposing a great plan for the adoption of the Government, have you arrived at anything approaching to figures as to the extent to which that scheme would go; added to the 10,000 miles of navigation, could you give an estimate of the ultimate mileage of the lateral navigations?—No, that might be carried out to any extent whatever; for instance, we have now in the little delta of the Godavery already 500 miles of navigation.

2706. Passing from navigation for a moment to irrigation, how many millions of acres do you estimate should be dealt with by canals, which would be irrigation, and not navigation canals?—I would make all the main lines of irrigation navigable; there is nothing but the very small branches of irrigation canals that I would not make navigable.

2707. Are we to understand you, therefore, to say that all you have as yet in your mind is 10,000 miles of canal?—Of main canal.

2708. But can you give us no approximate estimate of what extent of subordinate canal, whether navigable or not, would be necessary feeders to those 10,000 miles?—I do not say that they would be necessary feeders, because I say that those great lines would carry an immense proportion of the navigation, but every additional branch that you make would increase the traffic on the main line.

2709. How many acres would the main lines deal with?—They would deal with by far the greater part of the more populous country of India.

2710. Could you give us it roughly in millions of acres?—The total area of India is 1,500,000 square miles, and 10,000 miles, with a border of 100 miles, 50 miles on each side, would then be a million square miles.

Mr. *Childers*—continued.

2711. Then do I correctly understand you that two-thirds of the land of India requiring to be irrigated would be so irrigated by 10,000 square miles of navigable canal?—No, I do not think I could say that. A great portion of the canals that I am now mentioning would only irrigate to a small extent, or not at all; some lines would not irrigate at all.

2712. I want to have from you, if you please, the total amount of acreage requiring in your judgment to be irrigated, which your scheme deals with, and I want to know how many miles of canal, whether navigable, or for irrigation purposes only, would be required for it?—An enormous extent. We have 500 miles of considerable canal in Godavery for the irrigation of a million acres, and that system has besides 2,000 or 3,000 miles of branch canal. The total extent of branch canals is prodigious.

2713. But I want to know so that it may be on the records of the Committee, how much of that prodigious quantity may be estimated at in figures?—The total land of India, as I say, is 1,500,000 square miles; supposing we irrigated out of all that at present one-fifth, that would be 300,000 square miles, and that would be 150,000,000 acres.

2714. And for that 150,000,000 acres how many miles of canal would be required?—It would require an enormous amount. That 150,000,000 acres would require 450,000,000*l.* or 500,000,000 *l.* sterling to irrigate it all.

2715. And it would only deal with one-fifth of the quantity which you would propose to the Government to irrigate?—No, it would be one-fifth of all India.

2716. What proportion of the acreage which you propose to irrigate would be met by that first scheme?—I would propose it as an extensive system of irrigation; I would not lay down any precise quantity to begin with. I consider that every million acres that you irrigate is an immense point gained, and that would be combined with navigation; but I would not lay it down definitely.

2717. I want to know what the total scheme would be; that is to say, what is your idea of what the Government should work up to as the total scheme of irrigation?—The scheme I proposed in my last examination was, to begin with, that they should spend 10 millions a year for 10 years, and they might go on with it as long as they liked.

2718. How much of the total amount of land which you think should be dealt with would that provide for?—They might go on extending it to anything; there is no limit to it.

2719. Forgive me, that is no answer to my question. I want to know what is, in your opinion, as a matter of policy, the total scheme which the Government should have ultimately in view, when working upon this great plan; how many millions of acres do you think should be irrigated, either by navigation canals, which are also irrigation canals, or by irrigation works only, and up to which you think that over a series of years the Government should work. I want the

Lieut. Gen. Sir *A. Cotton*, K.C.S.I.

27 June 1878.

Mr. *Childers* —continued.

total of it all?—If they go on at 10,000,000 *l.* a year it would go on for 50 years; I have no limit to it whatever.

2720. May we take it as your answer that you propose that the Government should over 100 years spend 10,000,000 *l.* a year?—Yes, certainly.

2721. That is a thousand millions altogether?—Yes, I have no objection whatever to their doing that; I am sure India requires it.

2722. You are before the Committee as the proposer of a great scheme, and I want to know the limits of the scheme. May we understand that you propose to the Government the adoption of a plan under which for 100 years, 10,000,000 *l.* a year would be spent in irrigation works?—Yes, I know of no reason why they should not; but if you insist upon my limiting it, I will say 10,000,000 *l.* a year for 20 years, that is 200,000,000 *l.*

2723. Supposing that is done, at the end of 20 years what shall we have effected?—We should have for the 200,000,000 *l.* about 70 millions of acres irrigated.

2724. But what would be the position of the rest of the land which required to be irrigated?—It would be just the same as it is now.

2725. In your judgment, I presume that would be in a very unsatisfactory position?—It would be just in the position of the unirrigated land now. A great deal of unirrigated land is in a very satisfactory state.

2726. The scheme which you recommend to the Government of this country and the Government of India to carry out is a very great scheme; can you give us the limits of the scheme?—I give you as a limit 10 millions a year for 20 years, 200,000,000 *l.*

2727. If the Government would spend 10 millions a year for 20 years, and stopped then, would you be satisfied?—I do not say that I should be satisfied. What might occur before the Government had done that I do not know.

2728. Therefore, having regard to the present state of things, and without any knowledge of what the future development may be, you would be satisfied with dealing with one-fifth of the land of India which ought to be treated with irrigation works?—I do not venture to say that I would be satisfied; nothing would satisfy me. I would never stop till everything had been done that could be done; and everything you do opens the way for something more. What is impracticable or unadvisable now becomes perfectly practicable and advisable when you have taken certain steps in advance.

2729. When you had expended 200,000,000 *l.*, would you not have left a large quantity of country still, in your judgment, at the present time requiring to be dealt with, but not dealt with?—I might or might not; I do not know.

2730. Is your mind in so vague a condition as to that, that you could not say distinctly?—I do not know how far it might be advisable to extend it.

2731. May we take it that 200,000,000 *l.*, as far as you have formed a complete judgment, is the amount which we have to provide for?—Yes, I think it would be very wise to keep that in view.

2732. What would be the total mileage of irrigation and navigable canals for which that

Mr. *Childers*—continued.

would provide?—I think it would irrigate 70 million acres, and as the rule is that for every million acres there would be 500 miles of navigable canal—not of main canal, but navigable canal—it would be 35,000 miles.

2733. That would be 35,000 miles of navigable canal; in addition to that, how many miles of irrigation non-navigable would be within the scheme?—I could not say at this moment; but certainly it would be 2,000 miles for the 700,000 acres in the Godavery.

2734. Leaving that part of it uncertain, you would at least have to carry out 35,000 miles of navigable canal, and whatever ought to be the proportionate mileage of irrigation canal, in 20 years; under whose supervision would those extensive works be carried out?—That is not my business; I do not undertake that part of the business; I undertake the engineering part of the question.

2735. To whom would you give the execution of those large works?—To the engineer of course.

2736. To the Indian Public Works Department?—Yes, of course.

2737. You would entrust the expenditure during the next 20 years of 200,000,000 *l.* sterling to the Indian Public Works Department?—Yes, certainly.

2738. And you would make them responsible for carrying ont this great scheme?—Certainly, under the governors.

2739. How do you propose that the money should be raised?—That is not my business.

2740. As the promoters of this great scheme, how would you raise the money?—I should not raise it; I know nothing about finances. I would not recommend anything I know nothing about; I am not a financier, I am an engineer.

Mr. *Onslow.*

2741. Would not the getting of the money be rather an important portion of your scheme?—It is not an engineer's business to raise money. The railway engineers did not raise the 170,000,000 *l.*, it was the Government did it.

Mr. *Childers.*

2742. I am only asking you questions as to your plan; you do not give any advice, then, as to the manner of raising the money?—No, I do not.

2743. How would you recommend that the interest on this large capital should be charged during the construction of the works when they are not remunerative; should it be added to the amount borrowed?—Yes, certainly; that is a proper part of the cost of the works.

2744. Then it should not, you think, be charged during construction against the revenues of India?—No, of course it is part of the sunk capital in executing the work. Nothing can be more proper than that. If I am asked what would such a work cost, I would say the engineering cost of the work we will suppose is a million, and supposing it takes five years to execute, at 4 per cent. Government interest, there is an accumulation of 10 per cent. in addition; that is to say, the actual cost of the works would be 1,100,000 *l.*

2745. When you have spoken of 200,000,000 *l.*, have you included in that the interest during construction?

Mr. *Childers*—continued.

struction?—No, I did not, when I made that rough estimate, include the accumulation of interest.

2746. During how many years from the commencement of the construction of such work and the commencement of raising the money, do you think it would not be remunerative, or, in other words, how soon would it become remunerative? It is very different in different parts. Our Godavery works made a return the very first year that they began. Other works have been three or four years before they made a return; and some, through this dreadful mismanagement, like the Toombuddra works and the Orissa works, have not paid for 10 years.

2747. How many years would you take as a fair average?—I should think, as matters are, allowing for all mistakes and everything, you might with perfect safety say that they would be paying a fair return in 10 years from the time of beginning; that is, you would have to charge five years' interest.

2748. How would you charge the five years' interest; you say 20 per cent. in addition to the 200,000,000 *l.*?—Yes.

2749. That makes, does it not, 240,000,000 *l.*? Yes, that would be a proper part of the expense.

2750. What net income do you hope to derive from those works when they are in fair swing after the 10 years as against the 240,000,000 *l.* at which their construction must be taken?—It would be very various in different places. Some would be more successful than others; no doubt there would be some failures still, and some great successes probably. But what I wish them to yield would be the Government interest of money.

2751. What do you expect them to yield?—I should say they would certainly yield 7 or 8 per cent. if they were tolerably well managed, taking them all round.

2752. Four per cent. on 240,000,000 *l.* would just amount to 10,000,000 *l.* a year; as you anticipate that those works will yield, and as you recommend them to the Government on the ground that they will yield a net income of 10 millions a year?—Yes, I can safely do that.

2753. In calculating that have you allowed fully for repairs and renewal and for inevitable improvements?—Yes.

2754. How much have you allowed for that?—Three per cent. upon the primary cost is what we have ascertained to be sufficient for the management and repair of irrigation works.

2755. I am speaking only now of repairs and renewals, and what are called inevitable improvements, namely, the sort of improvements that you cannot charge to capital; how much a year do you expect would have to be spent on purposes of that kind?—Three per cent. on the capital.

2756. That is a little over seven millions a year?—Ultimately 6,000,000 *l.*, 3 per cent. on the cost 200,000,000 *l.*

2757. After the canals have been brought into complete and active operation, who do you propose should manage them as a matter of business?—Who manages the railways? It is just the same. You have 170,000,000 *l.* sunk in railways, and you have no trouble about finding management for them.

2758. The railways are managed the greater

Mr. *Childers*—continued.

part of them, say three-fourths, by large companies; do you propose, as I understand your answer, that those canals are to be managed by large companies?—No, I am supposing all of them under the Government. I see no objection myself to companies being employed upon them, but I am supposing that they were under Government.

2759. You are the author of a great scheme, and we want to know exactly what your view is as to how it is to be carried out, and it is very material to know who should manage them; and what I should be glad if you would tell me is this, after those canals had become matters of business, works intended to be remunerative and to attract business for navigation purposes, and to be well administered for irrigation purposes, who would you recommend should be the persons to undertake this business operation?—The head of the Public Works Department, of course.

2760. What extent of personel do you think would be required to manage such works?—I have nothing to do with that; I have no opinion about it; I never think about it.

2761. Have you thought of the number of persons who would be required?—No; I have nothing to do with that at all.

2762. Or what the cost would be?—No.

2763. Or how they should be appointed?—No.

2764. Or under whose business management they should be placed?—I have nothing in the world to do with that; I am an engineer; that is a matter for statesmen, and governors, and commissioners.

2765. Do not you think that the prospect of good management of the works which the Government is going to undertake is an important element?—Yes, of course.

2766. But you have not thought about it?—No, it is not my business; I have nothing to do with that.

2767. At the same time you think, speaking generally, that those should be Government establishments rather than private ones?—I do not know that I would say that; I should have no objection myself to employing companies. There are certain reasons for employing them in my mind and certain reasons against them; but I should be more inclined, I think, to do them by means of Government.

2768. If they were done by means of Government, would you place those establishments under the Central Government direction or under the Presidents or local Governments?—I must beg to say that all these are entirely out of my line. I am not a statesman or a man of business. I am an engineer, and, therefore, I have no opinions on these matters. If I am asked, I have certain floating ideas about them; I would give much more liberty to the local Governments than they have at present. I would have much less interference on the part of the Supreme Government with the local Governments. I see now that one misjudging Viceroy can paralise all India. If the several subordinate governors and commissioners were more independent, then the more energetic amongst them would carry out the improvement of the country, and would not be prevented from doing it by an inefficient Viceroy.

2769. Although you have not thought out the

Lieut. Gen. Sir *A. Cotton*, K.C.S.I.

27 June 1878.

Mr. *Childers*—continued.

question of Government management, you tend rather to local than to central supervision?—Yes, to a certain extent. Of course there must be that central supervision.

2770. And if this great plan is adopted for canals, involving 200,000,000 *l.* being raised in the next 20 years, what do you recommend that the Government should do about railway construction?—I would stop the railway construction entirely, except in places where they are essential, and where you cannot make a canal. It is a dreadful perversion of the public funds.

2771. In places where you cannot make a canal, you would, however, proceed with the present system?—There might be some few spots, but they would be very few.

2772. You will kindly remember that you are only dealing now with one-fifth of the country, which you think might well be the subject of canals?—With one-fifth of the area, but the canals would run through the whole country, of course.

2773. Where there are no main navigable canals, and where, from motives of economy or others, you do not carry out the whole of your scheme, on the sides of those canals would you construct railways there?—No, only where you could not carry a canal cheaper and carry cheaper. My position is this, that a railway is dearer, and railway carriage is dearer. The railway cannot carry the quantity you want, and the railway is indefensible in a case of disturbance, so that there is every reason for preferring a canal to a railway.

2774. I have read with great attention your evidence, and I quite understand your view upon it, and I am only examining you now upon what you just now said; you said that, although you think that canals ought to be executed to supply 1,000,000 out of 1,500,000 square miles in India, you would only, during the next 20 years, provide for 200,000 square miles. What I wanted to ask was this, whether with respect to the remaining 800,000 square miles you would employ the agency of railways at all, or whether you would do without them altogether?—Only in places where you could not cut lines of canal, nowhere else.

2775. But you only propose the employment of canals with regard to 200,000 miles?—But they would go through all the main lines of country. How far you would extend the branch canals to pervade the districts adjoining them is another question. Only I say that I would never make a railway where I could make a canal cheaper, and to carry cheaper.

2776. Still I must deal with your scheme as a whole; you only wish to apply your scheme to one-fifth of the area, to which you consider it applicable; what I want to know is this, as to the remaining four-fifths of the area, would you do nothing, or would you construct, to any extent, railways?—No. If further communication were wanted, I would cut canals, except where you could not make a canal.

2777. That would cost money, would it not?—Yes.

2778. In addition to that 200,000 miles?—Yes.

2779. How would that be provided for?—In the same way as the others, if you went on with it.

2780. Then it comes to this, that 240,000,000 *l.* does not really describe what you would spend within the next 20 years; but you would wish to spend a great deal more?—I do not say how much I would wish to spend; but I say that that would provide an immense network of canal water-carriage throughout the whole of India. It would not minutely pervade the country, but it would bring water-carriage within a moderate distance of every portion of the populous part of India.

2781. I am afraid we cannot therefore ask you to go beyond that; but you think a million square miles ought to be dealt with, and could be profitably dealt with?—I did not say a million, I took one-fifth of the area.

2782. Do we understand that 1,200,000 miles could be satisfactorily dealt with by canals?—I do not know, I am sure, to what extent they could be carried.

2783. What I understood you to say (and if I have not understood it correctly pray put me right) was, that the whole of India was a million and a-half square miles, but that about half-a-million square miles could not be touched by canals at all, that of the remaining part you would deal with about one-fifth, and that that one-fifth would cost 200,000,000 *l.* sterling in the next 20 years, besides 40,000,000 *l.* sterling for interest during construction?—Something like that.

2784. What I was asking you now was this, as to the remaining part of that million square miles, would you leave it alone during the 20 years, or would you make any railways, and so forth, there?—No, I would not make railways.

2785. You would make no railways over that million square miles?—No, unless you could not make a canal.

2786. And you would only carry out any extension of the railway policy over that, roughly speaking, half-a-million (or it may be more) square miles, where canals cannot be carried?—Yes.

Sir WILLIAM MUIR, K.C.S.I., called in; and Examined.

Sir *W. Muir*, K.C.S.I.

Chairman.

2787. I THINK the last two important posts you held in India were those of Lieutenant Governor of the North West Provinces and Finance Minister?—Yes.

2788. Previous to those appointments I think you had great experience as a Revenue Commissioner?—I was for many years Secretary of the Revenue Board at Agra, and then Secretary to the Government of the North West Provinces, under Mr. Thomason and Mr. Colvin, and then Member of the Revenue Board of the North Western Provinces. Then intervened the mutiny, after which I was called down from Agra to Allahabad, to be under Lord Canning, in the re-construction of the Government, which had been overthrown by the mutiny in Upper India. Then I resumed

Chairman—continued.

I resumed my position at the Board, and after that was called down to Calcutta to the Legislative Council, and became Foreign Secretary. After that I was appointed to the Executive Council, and then went to the North West Provinces, as you have just stated.

2789. General Dickens gave us some information concerning the system of assessment for water owner's rates in the North West Provinces, but he spoke entirely from a Public Works point of view; would you be kind enough to explain that system, speaking as a revenue officer?—The canal irrigation adds to the value of the produce, and, as such, adds to the value of the rent. The revenue is levied in two ways, on account of the canal water: first, by a water-rate, which is taken direct from the cultivators, the canal dealing directly with the cultivator, and not with the proprietor. The water-rate is taken, therefore, from the cultivator, according to the crop which is watered, the value of the crop, and the amount of water which it is required to give it. Then, as the rent is increased by the value of the irrigation, and as the settlement of the land revenue extends for a course of years, during the term of the settlement there was no way of reaching the profits gained by the proprietor, and in order to reach them during the term of the settlement, it was enacted by the irrigation law that an additional amount might be taken from the proprietor to represent the additional revenue that might, irrespective of the settlement, have been levied on account of the increased value of the land. Such additional amount, called the "Owner's Rate," would be taken during the currency of the settlement, and then at the close of the settlement a new settlement would be made, when the Government would have its full share of the increased value from the increased rental. That is, I believe, an answer to your question.

2790. Is the proprietor the occupier?—The proprietor is the superior or zemindar, having under him ryots or cultivators. The canal authorities deal direct with the cultivator, and not with the superior or proprietor.

2791. So that in the North West the cultivator pays rent both to the Government and to the proprietor?—He pays water-rate to the canal officer, and rent to the proprietor. He may be a proprietory cultivator. A very large number of proprietors in the North West are also cultivators, being both proprietors and cultivators, and in that case they would pay both the water-rate to the canal officer, and land revenue to the Government, and also increased revenue in the shape of the owner's rate.

2792. The proprietor who has, to use the English word, tenants under him, pays the land revenue to the Government for the land which is occupied and cultivated by his tenants?—Precisely so.

2793. Then the assessment for water-rate is fixed for the whole period of the settlement?—The water-rate is fixed year by year.

2794. But the increased assessment due to irrigation extends during the whole of the settlement?—The owner's rate is taken year by year in the same way as the water-rate; in Upper India year by year the area under irrigation is measured up, and a field book is made, and on that measurement the water-rate is assessed, and simultaneously with the assessment of the water-rate the owner's rate is assessed upon the area irrigated year by year. At the end of the settlement the area found to be under irrigation would be assessed with its additional land revenue, and then the necessity for the owner's rate would be superseded altogether.

Chairman—continued.

2795. Then are there two distinct rates directly levied for the use of irrigation, the water-rate and the owner's rate?—Yes, since the Canal Act of 1873 the owner's rate has been introduced. Before that there was only a single rate, the water-rate. There was no means of assessing the increased value to the land revenue, until a new settlement.

2796. Then the water rate represents a portion of the increased value of the land irrigated, that part which benefits the tenant, and the owner's rate represents the portion of the increased rent, which the owner gets from the irrigation being given to his tenant?—Quite so.

2797. Is there not some other assessment for irrigation besides this water-rate and owner's rate; is not the land revenue enhanced?—It would be at the close of the settlement. I was going to say, that the owners rate is equally applicable to the permanently assessed districts in the North Western Provinces, of which there are four, as it is to the temporarily assessed, and there it would be a continuing arrangement, there being no new settlement possible there. In Bengal it was proposed to have had this same arrangement of the owner's rate, but it dropped out of the Bill which was proposed, in consequence of some larger scheme, as I understand, which was introduced (but has not yet been passed) of having a compulsory rate to be assessed generally, so that in Bengal the arrangement for the owner's rate no longer exists.

Sir *George Campbell.*

2798. In fact, it never did exist?—No. Then as regards the question as to the assessment to the land revenue, the owner's rate is a very rude mode of reaching the increased land revenue which the State may claim from the increased value of the land from irrigation. When a new settlement comes on at the close of the existing one, the settlement officers would step in and claim their full share of the increased value of the land from irrigation, and the owner's rate would no longer exist. Reference has frequently been made before the Committee to the indirect revenue gained from the canals. Before there was any arrangement for an owner's rate there was no mode of getting at the increased value of the land due to the State until the close of the settlement; settlements have been falling in, and new settlements of the land revenue being made since about the time of the mutiny, or since 1855. As the new settlements were made, it became evident that a considerable portion of the increase of the land revenue was due to the increased value of the land from irrigation, and the canal officers claimed that they should have credit given to them on account of this increased value. The claim was regarded as extremely reasonable, and the Board of Revenue issued instructions, which have been explained generally by the irrigation officers here as to the mode of arriving at the amount of indirect revenue, which was broadly of this nature, that the settlement officer was to calculate what would have been the revenue had there

Sir *W. Muir*, K.C.S.I.

27 June 1878.

Sir *W. Muir*, K.C.S.I.

27 June 1878.

Sir *George Campbell*—continued.

there been no canal irrigation; and, looking to the general state of the village at the previous settlement, the amount of wells and well irrigation from other sources, to make as fair an approximation as he could of what would have been the revenue of an estate had there been no canal irrigation, and the difference between that and the revenue which he actually did assess was then taken as what is called the indirect profit accruing from canal irrigation or the advantage to the revenue from the existence of canals. I may say that this, especially in some of the earlier settlements, has been very imperfectly ascertained; it is merely an estimated quantity, and although the estimate may sometimes, but rarely, be on the side of the canal, it is much more likely to be against the canal, and to be incomplete.

Chairman.

2799. Then, as I understand you, there is a direct rate levied for the use of the water, which rate varies from year to year, in proportion as the water is used, and there is an indirect revenue credited to the canal, but this indirect revenue does not vary from year to year, but is fixed with the settlement?—Quite so; what was before owner's rate would, at a new settlement, merge into the land revenue. It is credited, not to the canal, but to the revenue, it being impossible to distinguish accurately the exact amount which is due to the canal, and therefore it is impossible to credit it in the financial accounts to the canal; it is all counted under the head of land revenue.

2800. Then this water-rate is what is meant by direct receipts, and the increased land assessment is what is meant by indirect receipts?—Yes, excepting that the indirect revenue is not credited to the canal, but being land revenue essentially, is credited to land revenue.

Sir *George Campbell.*

2801. You say that it is not credited to the canal, but the canal officers, in the statment of accounts, take credit for it, do they not?—The canal officers, in their administration reports, take credit for it, as we say, for the indirect revenue.

2802. I understand that there are three kinds of revenue derived from the canal; first, there is the direct revenue; and then there is the indirect revenue, which is the addition made to the existing settlement on account of the canal; and then there is this still more indirect revenue, which is a portion of the existing settlement, which is a matter of account as estimated by the settlement officers to be due to the canal?—Quite so, excepting that your second category would fall away altogether when a new settlement was made.

2803. But what you call the indirect revenue is the second category?—No, there may be both indirect revenue and also owner's rate in addition to it. For instance, the settlement of Scharampore may have shown an increase due to the canals, say the Eastern Jumna Canal, of 50,000 rupees, and since the settlement was made, irrigation has extended in the district, and on that irrigation which is extended in the district, but which was not taken account of at the time of the settlement, the owner's rate is assessed in addition to the in-

Sir *George Campbell*—continued.

direct revenue which the canal is gaining according to the report of the settlement officers.

2804. Then there is the direct revenue, not only due to the new canal, but to the older canals, such as the Eastern Jumna Canal?—Undoubtedly the canals are fairly credited with all the increase of revenue which is due to them, and which is dependent upon the continuance of their irrigation.

2805. Although it may be an old canal?—Yes, although it may be an old canal; the old canal irrigation only began from the Eastern Jumna, about 40 or 50 year ago.

2806. But it is a revival of an old work?—There was no irrigation from it before that time.

Chairman.

2807. Then there are three sources of revenue which are credited to irrigation administratively?—Yes, of which one is temporary during the currency of the settlement.

2808. Then in the case of the owner being also the cultivator, he would pay the water-rate and the owner's rate?—Quite so. As an instance of that, say that a cultivator holds a farm which yields 12 rupees rent, and by irrigation that has been increased to 18 rupees, and say that according to the ancient custom of the country, the half was taken as rent by the proprietor, and a half remained to the cultivator; therefore, before the canal came, the cultivator kept six rupees of that, and gave six to the zemindar. That is increased by canal irrigation to 18, and now the cultivator keeps nine and pays nine to the zemindar. The cultivator probably has paid a rupee, or say one rupee and a-half, to the canal officer on account of the water; so that instead of having six rupees before, he now has nine, out of which he pays the water-rate, and still has gained by the canal. The zemindar formerly got six, and now he gets nine; he pays, say, one rupee additional as owner's rate or indirect revenue, and it is profitable to him; he has gained three rupees, of which he has paid as indirect revenue, a rupee and a-half, or according as the rate may be.

Mr. *Fawcett.*

2809. He get a clear profit without spending sixpence?—Yes, no doubt he does, and the owner's rate is intended to catch a portion of that and bring it into the Government treasury. At the new settlement the owner's rate would cease entirely, and the revenue would be assessed upon the rental as it stood enhanced by the irrigation of the canals.

2810. Then according to that description, if irrigation work is carried out at the commencement of the settlement for 30 years, what would virtually happen would be this, an extremely valuable present would be made to the zemindar out of the general funds of India without his contributing a single farthing?—Unquestionably; in carrying out a great work of that sort you benefit a class of persons who have not contributed directly to it; you benefit them directly, and are unable to charge them the full amount of the advantage which you have given them, but at the close of the settlement you would come in and take the full amount.

Chairman.

2811. To adhere to the figures which you have illustrated, in case the cultivator by taking the water

Chairman—continued.

water increases the nett value of his produce from 12 rupees to 18 rupees, of that increase of six rupees three goes to the zemindar or the landlord, who pays a certain portion of it in the shape of owner's rate to the Government, keeping the rest, and of the three rupees which the cultivator retains, one or more would go to the canal in the shape of water-rate?—Yes, quite so.

2812. That accounts for two sources of revenue to the canal; which is the third source?—The third source would not come into effect until the new settlement, unless it had been claimed at the last settlement.

2813. Say that a man takes water from the canal he pays for it in the shape of water-rate; does he pay anything more besides that water-rate?—He pays water-rate, and he pays under the law whatever rent his superior may think proper to enhance on account of the increased value of his land.

2814. Then of that increased rent which he pays to the owner the Government takes a certain portion, in the shape of owner's rate?—Quite so.

Mr. *Fawcett.*

2815. Suppose, to take your example, there is a settlement of 30 years, the Government has not the power, during that time, to increase the land assessment?—It has not the power to increase the land assessment, although the power has recently been taken by law to add a cess, on account of the famine.

2816. But has the proprietor under whom the cultivator rents the power to increase his rent at any time?—He has the power to increase his rent, under the rent law, under certain conditions, which allow him to raise the rent of the cultivator, according to the class of cultivator, and the rates of rent current in the vicinity. Where the cultivator is a tenant-at-will, of course the proprietor may take, at the close of the year, any rent he chooses, or say, "Go out."

2817. But there is a considerable quantity of land cultivated by tenants-at-will, is there not?—No doubt of it; a very considerable quantity.

2818. According to that, supposing land which before yielded 12 rupees is irrigated, and now yields 18 rupees, the cultivator pays three rupees additional to the proprietor, does he not?—I am merely taking that as an average example under the old custom, by which the rents were taken in kind, half-and-half.

2819. But there is nothing whatever to prevent a proprietor, from a tenant-at-will, extracting every single sixpence of additional produce which the tenant-at-will does not pay to the Government?—No doubt, except there is the *argumentum ad verecundiam*, that rents are settled by custom in India very much, and the proprietor would seldom ask for more than what was ordinarily taken from irrigated land.

2820. But still legally it stands like this, that the less the Government takes of the additional produce as yielded by the land by irrigation, so much the more has the zemindar, as it were, to pounce down upon if he likes?—You are quite correct in saying that; and the reverse holds true that the more the Government take on account of the water-rate, the less remains for the zemindar.

2821. And, therefore, it need not necessarily follow that a light irrigation rate is of any advantage whatever to the cultivator, it may simply leave more for the zemindar to take?—To some extent; but as rents are settled by custom, the irrigated rate would not be pressed over-much by the zemindar, even if a very light water-rate were taken.

Mr. *Fawcett*—continued.

2822. Have you known of no instances where that as been done?—I remember no instance in which there has ever been any objection has been taken. Of course such cases may, and no doubt do occur; there is a summary rent court in which these cases are continually treated, but no instance of unfair assessment on the part of the zemindar has come to my notice; such cases are disposed of by the courts, and unless very numerous would not be noticed by the Government.

Mr. *Hardcastle.*

2823. Is the summary rent court for the protection of the cultivator against the zemindar?—For suits of all kinds on both sides, both by the proprietor against the tenant, and by the tenant against the proprietor, for exaction.

2824. If a zemindar were to impose an increased rent upon the cultivator, in excess of what you say is the custom of the country, would the tenant have any protection from that court?—He would if it were proved to be more than the ordinary rate paid by land of a similar quality in the vicinity; that is to say, if he were a tenant having rights of occupancy.

Chairman.

2825. I suppose the zemindars or proprietors by announcing their intention of taking a large proportion of the increased produce of the land due to irrigation, might prevent the spread of irrigation by not making it worth the tenant's while to use the water?—Their claim would always follow in the wake of irrigation; it would always be to their advantage that irrigation should spread in order that they should get any increase of rent whatever. I know of no instance in which they have pressed their claim by any previous declaration of intention to assess their rents exorbitantly, and so have hindered the increase of irrigation. On the contrary, the feeling in Upper India in favour of water in all classes, both with the tenants and the proprietors is exceedingly great.

2826. Then you do not think that the spread of irrigation is at all strained by the land system in the North West?—Certainly not in my experience. What may be the causes that have operated in Orissa I have no means of saying; it is beyond my personal observation; but in the north of India certainly it is otherwise. On the Agra Canal, for instance, a canal made during my administration, where the demand for water on all sides was exceedingly great, I have heard of no occupants of the land being hindered from taking it by any such cause as you mention.

Sir *George Campbell.*

2827. You think it is decidedly to the interest of the zemindars to encourage irrigation, and not to discourage it?—Certainly.

Chairman.

2828. You have mentioned to us that the tenant by taking water increases the value of the produce of the land, and that according to that increase, he pays water-rate; who assesses the increased value given to the produce by his using irrigation?—The water-rate is assessed according to a fixed tariff of rates by the Irrigation Department, approved by the Revenue Department of the Government,

Sir *W. Muir*, K.C S.I.

27 June 1878.

Chairman—continued.

Government, and the tariff varies with the value of the crops irrigated, and with the quantity of water which is supposed to be required for them, varying from one rupee an acre to five or six At the close of each irrigation season, or as soon as the land is supposed to have been irrigated generally from the canals, the measurers are sent forth, who go over the fields, and a field book is made of the area irrigated, and those rates are applied which are in the tariff of irrigation, and the result constitutes the revenue from the water-rate. The application of the owner's rate is of a more simple nature. The amount is determined by the Government at a low average rate, because under the law it is laid down that no more shall be taken than is equal to one-half of the increased value of the land from irrigation; but the amount of it varies from one rupee to one rupee and a-half, or more.

2829. Then is this average rate about half the increased value?—It must by law be within the half.

2830. Who assesses the increased value; and what is the mode by which that is done?—It is extremely difficult accurately to say what the increased value is, and therefore experimentally a rate was introduced which had some proportion to the water-rate; one-third of the water-rate, I think; but the system was no doubt susceptible of improvement. It was obliged to be done in a very rough manner, because at the best we cannot by the owner's rate reach the full amount of the revenue which is credited to the Government, unless we were to introduce a new settlement and go with great detail into the increased value of each field, and therefore the Government contented itself with an average rate which it was obliged to keep low, in order to meet the requirement of the law, that it shall not exceed one-half of the increased value.

2831. The amount of increased rent which the owner would receive would be determined by the Goverment assessment of the increased value of the land?—The increased rent taken by the owner is entirely a matter in his own discretion. The Government assumes that in bringing irrigation they have increased the value of the land so much that the zemindar can demand, and the cultivator afford to pay, an increased rent.

2832. Then the owner's rate is estimated as accurately as it can be, but it is irrespective of the actual amount which he gets from his tenant?—That is not necessarily known. The owner's rate is an estimated amount kept low, as I said, in order to be within the limits laid down by the law that it shall not exceed one-half of the increased value of the land.

2833. I suppose it is not possible to assess the increased value of each individual field or holding?—Entirely impossible, unless indeed you were to have a detailed and expensive inquiry, which would be hardly possible during the currency of any existing settlement.

2834. I think in your financial statement you once or twice quoted the figures of the administrative report of the Public Works Department; I suppose you think that the returns which were credited to irrigation in the north west in those reports were fairly accurate, and might be relied upon?—Undoubtedly; and rather, as I said, understating the enhancement that had been caused by the increase of land revenue from the canals.

Mr. *John Cross*

2835. With regard to the difference between 12 rupees and 18 rupees, I think you said that supposing the value of a crop is increased from 12 to 18 rupees, 2½ rupees of that goes to the Government; one rupee to the water-rate, and the other 1½ rupees to the owner's rate, making together 2 rupees; what becomes of the other 3 in the account; is credit taken for it in the Public Works Department as advantage derivable to the revenue?—They would merely claim one rupee, or two rupees, or whatever it might be, taken as water-rate from the cultivator, and also they would take credit in their reports for the owner's rate, which I have been describing to the noble Chairman, one rupee, or one rupee and a-half, or whatever it might be upon the acre. They would take credit for that in their administrative reports; it does not go otherwise into the irrigation accounts. All that goes into the canal accounts is the water-rate.

2836. I want to know how much they would claim advantage upon; how much they would say was due to irrigation?—They would claim as creditable to the canal the water-rate, and also take credit administratively for the owner's rate. That would be all.

2837. In fact they would claim 2½ rupees out of the six?—Yes, you may take it so now if the rates were higher.

Mr. *Fawcett.*

2838. Is not this the case, supposing irrigation increased the productiveness of the land by six rupees according to your figures, that six rupees might be referred to as divided into four parts; first, there would be *Rs.* 1. 8. direct rent from the cultivator, and one rupee as an indirect rent from the proprietor; both those would be considered irrigation revenue, and of the remaining *Rs.* 3. 8., one portion would represent the extra profit to the proprietor, for which he would not contribute a single shilling, and the remaining element would represent the extra profit to the cultivator?—Theoretically, that is exactly the case.

Sir *George Campbell.*

2839. But it is not necessary that there should be any extra profit to the cultivator?—There may not be; it may be all taken up as canal rate by the Government, or as rent by the proprietor.

Chairman.

2840. I suppose there is no estimate of the amount of land revenue which is saved in years of drought by irrigation?—That is an extremely important element in calculating the benefits of the canals to the country and to the Government; but it must be a matter of mere estimate; it is frequently referred to in the administrative reports; for instance, in the famine of 1861, in the introductory chapter of the report a very large amount of saving is attributed to the effect of canal irrigation in the North West Provinces, saving the crops.

2841. Would you like to put that report in?—I should like it to be looked at; the introductory chapter is all that is required.

2842. Of course the land revenue can only be saved during the time of great drought, where the sources of irrigation are permanent?—Where the sources of irrigation are permanent, that is to say, where the source of water supply does not lie within the area of the famine; it need not

Chairman—continued.

not be permanent, but it may lie altogether beyond the area of famine in a part of the country which has received a full supply of rain.

2843. Therefore I assume that in the North West nearly all the irrigation is supplied from rivers whose sources rarely fail?—It is so. Designs have been formed for canals in Bundlekhund from rivers rising in Central India, such as the Betwa and the Cane. These would pass through a part of the country which is very dry, and the water is too deep and too difficult to get at for any well irrigation, but such canals would be liable to the defect I have mentioned of having their sources liable to fall under the influence of short monsoons. On the other hand, the perennial sources from the Himalayas are so dependant upon the melting of the snows as to be in the strict sense perennial, but they are in some slight degree fluctuating; and when the fall of rain is very short, there is always a certain degree of anxiety as to whether they, too, may not in some measure fail of a full supply. And there is another source of anxiety connected with canal irrigation, and that is mentioned in this report. At the close of the famine year in the North West Provinces, 1868-9, when the rains failed, the land was so very dry and so very needing irrigation, and water consequently so much sought after, that irrigation was extended to an immense extent almost beyond the capacity of the canal to supply it. Its resources were strained to the very utmost; so much so that the winter rain having failed, we were in considerable doubt as to whether the canal could carry this excessive area of cultivation to a successful issue in harvest; but towards the close of January, providentially, a fall of rain occurred, which lasted for about a week, and saved us from that anxiety; otherwise, what the strain upon the resources of the canal would have occasioned it is impossible to say. There might have been a very disastrous result from the crops being brought near to harvest maturity, and not having sufficient water to prevent their prematurely drying up.

2844. That was from the Ganges Canal, was it not?—Yes, the Ganges Canal, and also the Eastern Jumna Canal.

2845. As regards the North Western Provinces, are they sufficiently protected now from drought by the present works?—The phrase "sufficiently protected" is a phrase which has not perhaps a very exact meaning. Complete protection I do not suppose we can give by any system of canals. We can completely protect the immediate vicinity irrigated. The large areas which in the famine tracts of 1860-61, for instance, and in those of 1868–69, were not absolutely barren and unproductive, were sustained only by the canals or by wells; but there are still large areas in all the districts, and in some districts the whole of the areas are unprotected; and of course a further extension of the canal system would add to the amount of protection given by canal irrigation. Some districts are very largely protected as the districts at the upper part of the Doab, especially the districts of the Meerut division; but even there there are pergunnahs and tracts of land which would suffer in case of an absolute drought. Then as you go further down, the lower part of the Doab will be further protected by the addition to the Lower Ganges Canal, which is being carried out in the lower part of the Doab; but there are large

Chairman—continued.

Sir *W. Muir*, K.C.S.I.

27 June 1878.

portions of Rohilkund which are beyond the influence of canals altogether. A canal was projected called the Eastern Ganges Canal, which I advocated strongly, as it would have protected a considerable portion of the districts of Bijnore, Muradabad, and Bodoun, from the effects of famine. The scheme was canvassed very largely and carefully, but the Government eventually came to the conclusion that the canal was not needed; and the opinion of the landed proprietors themselves was somewhat, averse to it. I was anxious that a further inquiry should be made regarding it, but when I left the North West the opinion was, upon the whole, adverse to the scheme; that scheme might possibly be carried out still. It would add to the protective power of irrigation a very large tract of country; but there are no doubt arguments to be weighed on both sides. Then again, on the right bank of the Jumna there is a very large portion of country there which is destitute, to a large extent, of wells, and that has been partially supplied by the Agra Canal that we spoke of, and which was opened just before I left the North West, in 1874. That will very considerably protect the districts of Goorgaon, Muttra, and Agra. Coming further down, the districts of Bundelkund are very dry, and very much exposed to famine. They have suffered very severely from famine so far back as I remember, first from three or four severe famines before 1833, and then the great famine of 1837 they suffered severely from. There were two projects proposed for that part of the country, from the rivers Betwa and Cane, which I spoke of just now, but there is some doubt as to the engineering details of them. If they could be carried out, of course, it would be an immense advantage to the country, and save the people from distress, and be a backbone of food to that part of the country in case there should be any further famine there. As you come further down the country again, you get into the Benares ivision and the district of Gurruckpore. You get more into better watered country, with more wells in it, and there possibly is little further need of artificial irrigation other than from wells.

2846. Does the rainfall vary much in the North Western Provinces?—The rainfall varies very considerably. It is heaviest in the Benares division, and it becomes gradually less as you go north-west. It keeps heavier under the Himalayas. The average is from 40 to 50 inches in the districts lying immediately under the Himalayas, and as you get further away from them, it becomes less and less until you get down to about 20 inches as you come into the tracts south of the Jumna.

2847. And most of the irrigation works of the North West are in the upper part, which is where the rainfall annually is lowest?—Quite so. The part of the country that I mentioned, which would be met by the Eastern Ganges Canal, the project which was put aside, would be part of that country in Western Rohilkund which has generally been most exposed to drought, the western monsoon coming up in great bursts from Bengal and spending itself before it gets further up that valley, and the same remark applying in the opposite direction to the south-east monsoon; and, therefore, when there are famines it is in the western part of Rohilkund that they have felt them the worst; at least that is my experience.

Thursday, 4th July 1878.

MEMBERS PRESENT:

Mr. Agnew.	Mr. Hardcastle.
Mr. Ashbury.	Mr. Sampson Lloyd.
Mr. Childers.	Sir Joseph M'Kenna.
Mr. John Cross.	Mr. Ernest Noel.
Mr. Fawcett.	Mr. Onslow.
Lord George Hamilton.	Mr. Edward Stanhope.

LORD GEORGE HAMILTON, IN THE CHAIR.

Sir WILLIAM MUIR, K.C.S.I., called in; and further Examined.

Sir *W. Muir*, K.C.S.I.

4 July 1878.

Mr. *Edward Stanhope.*

2848. I THINK the point at which we arrived the other day was, that you were going to express to the Committee your view as to the new works which were desirable with respect to irrigation?—Some of them have been mentioned by me, and perhaps I may allude to a few more of them; there is the Sarda Canal, which was projected some ten years ago to be taken from the River Sarda, a little below its embouchure from the Himalayas, to run through the district of Shahjehanpore through the whole of Oudh, and to tail into the Ganges in the Benares division; it was surveyed, and the designs completed in a tolerably complete form, but a good deal of opposition was raised to the canal on the ground that it would not be remunerative, and that it was not, in fact, needed, as it passed through a country already well watered by wells, and otherwise of a moist character. The landowners themselves were generally believed to be opposed to it, and, after being carefully considered, it was, as I think rightly myself, put aside.

2849. When was it given up?—About six or seven years ago. Then in Rohilkund there is a system of sub-Himalayan canals which derive their sources from the sub-Himalayan ranges, not from the snows; and they have been extremely useful in that part of the country which is called the Terai. Originally, like most of the canals which were formed at first, their course took the valley or trough of the river from which they were drawn, and the result was that the country irrigated by them was a good deal waterlogged; but from the experience gained by the longer use of canals, they have now been carried along the watershed, the higher part of the country, and they are thus enabled to command the drainage better. The whole of that country has been immensely improved by these canals, and they are being rectified and extended, and irrigation is going on now from them. A part of the country in the Terai, which was of a deadly pestilential character, has been very much redeemed and benefited, not only in its prosperity, but also in a sanitary point of view, by those canals. There are also a number of smaller works, but of great value, bordering on Rohilkund, in a part of the country which is called the Bhabur, immediately under the Himalayas. This is a tract of country which is formed of boulders, stones and sand, where the water percolates rapidly through this stratum, which is very deep, and there is an impossibility therefore of having wells or any other mode of irrigation there; the country is forest country, and used to be so deadly for more than half of the year, that to sleep there only during one night at some seasons involved almost certainly an attack of fever, which was very often of a deadly character, and the tract was consequently unoccupied. General Ramsay has brought a number of small canals into the upper fringe of the Bhabur tract, and a comparatively large range of country there has been reclaimed and rendered perfectly healthy, so that not only the Natives, but Europeans, can go down now, for instance from Nynee Tal, at any time of the year into that part of the country which has been reclaimed; and it has this additional advantage, that this large fringe of cultivation which is entirely dependent upon those small canals, furnishes a very large amount of grain; and when there is any danger of a famine in the adjoining hills, as sometimes occurs if the rains fail there, this forms a granary for the supply of the hills, and has frequently been of the most essential use in that respect. These canals have only been recently, within the last 15 or 20 years, constructed by General Sir Henry Ramsay, Commissioner of the Province, partly from the local funds of the place, and partly by loans granted to him by the Government of India, which are being repaid from the increased receipts derivable from this tract of country.

Mr. *Edward Stanhope*—continued.

2850. Do I understand you to say that this district was hardly capable of cultivation before the canals were made?—Entirely incapable.

Mr. *Onslow.*

2851. Is the grain exported to the Himalayas?—Yes; or, if not required there, to other districts in the plains.

2852. Are not the Himalayas able to grow sufficient for the population of the Himalayas?—In ordinary years they are; but, like the plains,

Mr. *Onslow*—continued.

plains, they are liable to a deficiency of rain, and if the rain does not come at the right time, the evils of famine are exaggerated there by the difficulties of carriage in the mountain tracts.

Sir *Joseph Mc Kenna.*

2853. What is the extent of the territory to which the description you have just given applies?—Compared with the whole area of the North Western Provinces, it is comparatively small, but it is of considerable extent; I cannot from memory mention the number of square miles, but I will put in papers on the subject for the information of the Committee.

Mr. *Onslow.*

2854. In your time has there ever been a famine in the Himalayas?—Yes, repeated threatenings of it. In point of fact scarcity has been more than once relieved, and was so, I believe, last year, by having a store of grain from this reclaimed country. Those works are partly in progress of completion and extension, and cultivation is being extended from them even now, so that I should think that it would be difficult, perhaps, to get at any exact account of the entire area brought under cultivation.

Mr. *Edward Stanhope.*

2855. Is there a large proportion of the population in the hills liable to the famine that you describe?—Very considerable.

Mr. *Onslow.*

2856. Whereabouts was that district in the hills where there was a scarcity last year?—In the Kemaum.

Mr. *Edward Stanhope.*

2857. Were those small works which you have described in the Himalayas costly work?—Very economical; the largest one, only recently completed, cost from 20,000 *l.* to 25,000 *l.*, and there are several smaller ones.

2858. Were they long in making?—No, one of the largest was commenced by General Ramsay while I was in the North West, and I believe it is completed now; it will take some years to complete the entire system; they are being gradually extended as he has funds; I may say that the springs are generally unfailing, and General Ramsay has rendered them more unfailing. There are a number of lakes in that part of the Himalayas which he has dammed up, so as to have always a continuous supply, which is replenished during the rains, and furnishes a very steady and uniform source of irrigation to this part of the country, and the supply has not been known to have failed hitherto.

Mr. *John Cross.*

2859. Then you would say that these works protect a considerable district from famine?—Yes, undoubtedly.

Mr. *Onslow.*

2860. Are those navigable canals?—No, they are small.

2861. Do you know the depth of them?—They are very rapid, and from being very rapid, there is a very sufficient volume without any great depth.

2862. It would be impossible, I presume, to make them the means of transit?—Impossible; that is not the object.

Sir *Joseph Mc Kenna.*

2863. You mentioned that those works were partly constructed from local funds, and that they were paid off from time to time?—I may explain that in this part of the country the revenue is abnormally administered; General Ramsay taking credit locally for all the additional revenue that he creates by the extension of cultivation, and the Government of India in the Financial Department have rather winked at this. It is against their rules entirely, but he is allowed, as his administration is of a careful and paternal character, to take all the money he can make by the extension of cultivation and the founding of new villages, and re-invest it in those works; and as the works advance, and the cultivated area extends by increased reclamation, so his means increase, and it was on one of the larger works of the kind which I mentioned that he was allowed an advance on one occasion of about 20,000 *l.*, engaging to repay it from the increased receipts arising from the extended cultivation.

2864. It would be very interesting if we could have the particulars of those transactions, because they are to a certain extent peculiar, and they appear to have been very advantageous; are there any sources from which we can get the precise particulars of them?—There would be no difficulty in getting them, and I will put in papers on the subject; but I doubt whether it would answer your purpose if it is meant to apply the same principle to large areas elsewhere, because the condition of the tract is peculiar, and the financial arrangement which I spoke of is entirely exceptional and somewhat irregular.

2865. I do not for a moment suggest that it should be applied generally; it is simply for the purpose of guiding us as to the extent of profit which, under the best description of management, could be derived from works of this nature, when carried out under a local and skilful government?—If this is an object of importance to the Committee I will endeavour, as I said, to get what is required.

Mr. *Ernest Noel.*

2866. Does the revenue arise chiefly from water-rate or from increased land revenue?—The cultivation in the part that I have been speaking of is so entirely dependent upon the water, that, like Sindh, the whole is taken in the combined water-rate and revenue.

2867. Then there would be no land revenue without a water-rate?—No, being entirely dependent upon the water, there would be no land revenue.

Mr. *John Cross.*

2868. You said that General Ramsay received an advance of 20,000 *l.*, to be repaid; is any part of that repaid?—I think before I left India it was almost all repaid; at least a very considerable part of it.

Mr. *Onslow.*

2869. I understand that this particular canal was raised by money advanced somewhat irregularly, but supposing the Government of India themselves were to make canals of a similar class, would it be possible along the whole length of the foot of the Himalayas for them to make canals of that kind?—The sources that I speak of are very limited, and they have been, I am afraid, at least in this locality, almost used up. To some possible extent the same

Sir *W. Muir*, K.C.S.I.

4 July 1878.

Mr. *Onslow*—continued.

same system might be applied elsewhere, but it is very much owing to the conformation of the hills at that place where there are lakes which can be banked up in order to make the supply more secure, that General Ramsay has been able to do this in those particular localities. Possibly other places might be found where the same system might be applied in the further Terai eastward down by Goruckpore. I made inquiries there with the view of finding out whether similar works might be made there, and the result was not encouraging; but, no doubt, the Government will, so far as there may be necessity for it, continue such inquiries.

Mr. *Fawcett.*

2870. Is not this the drift of your evidence, that this case, which is very exceptional, must be regarded as an exceptional one in consequence of the situation and the natural features of the country, and so far as you know it is not capable of any important extension?—Not of that particular kind.

Mr. *Onslow.*

2871. You are talking now of the only part of the Himalayas which you know yourself, but supposing we were to go to the east, between Darjeeling and this particular canal, of course, your knowledge of the Himalayas is not so extensive as that, but you are not aware of the Government of India ever having examined the Himalayas in those particular districts for this purpose?—I believe they have, with reference to the late famine in Behar; and there may have been some projects, but I should not think that they would be quite the kind of works which I have been speaking of, and which are exceptional.

Mr. *Ernest Noel.*

2872. About Darjeeling, I suppose, there is so much larger rainfall, that such a work would not be necessary?—That is so.

Mr. *Hardcastle.*

2873. With regard to the attraction of population which you have spoken of to this previously uninhabited locality, do you think that, from your experience, there would be reason to suppose that a considerable population would be attracted in Sindh into the desert country there, along the Indus, which we have been told is quite capable of being rendered productive by irrigation?—Wherever you have a canal, and provide means of agriculture, the population will follow, undoubtedly.

2874. Would not there, probably, in Sindh be some difficulty as to the races or religions, or sects, in bringing persons from a distance?—My personal experience does not extend to Sindh, but my presumption is that where you provide the means of irrigation the population will grow up; but it is not a subject in which with reference to Sindh I can speak from personal experience.

Mr. *Edward Stanhope.*

2875. There are other canals of a similar character, are there not?—Yes, there are other similar canals in the Doon; they are also limited works, but they have been of immense service both in increasing agriculture, in promoting the cultivation of tea, and in reclaiming certain parts of the Doon, which were unhealthy before.

Mr. *Edward Stanhope*—continued.

2876. Are those small channels like those which you have been speaking of?—Yes, they are small channels, and the peculiarity of them, as well as those which I was speaking of before, is that the soil being stoney, the greater part of them are made of masonry. Some of them are small things in comparison with the great canals; they are in relation to them mere toys or playthings; but still they are of very considerable advantage with reference to the parts of the country which they pass through. Then there is another class of works which might be extended in the form of tanks, or lakes formed by damming up the water in various parts of Upper India, in a way that might be in some localities extended with advantage.

Mr. *John Cross.*

2877. Are you speaking of the districts north of the Ganges?—No, of Upper India generally; there are districts south of the Ganges in Southern Mirzapore, where those tanks have been made, and throughout Bundelkund they have been made to some extent also, and irrigation is being derived from them, which adds to the prosperity of the country decidedly, and, to some extent, it also prevents famine; but the areas there being themselves liable to a deficiency of rain, the remedy is, of course, proportionally imperfect; that system of tanks or small lakes has been very widely adapted in Ajmere, and there it has been of extreme value in adding richness and prosperity to the country, but, at the same time, from a similar cause, they are liable to fail in times of drought.

Mr. *Edward Stanhope.*

2878. Are those all modern works which you are speaking of?—Most of them are; in Ajmere, where the system of these lakes was established by Colonel Dixon, and promoted very much by Mr. Thomason, the Lieutenant Governor, some 30 or 35 years ago, but we might notice that these tanks add to the population which follows the sources of increased production very rapidly, and when drought comes the increased population, of course, increases the number of mouths to be fed, while the water in these lakes is not sufficiently replenished; but there is no doubt that they have added very largely to the prosperity and richness of the province of Ajmere, and consequently to its general ability to withstand calamity. Works of that kind which I have been speaking of last might be extended very considerably, and with advantage to the country, and are being by degrees extended.

2879. I understand you to advocate the extension of those small works rather than the adoption of any large scheme in the districts you have referred to?—I do not speak of them in the least in antagonism to others; the large schemes, if they are good schemes, no doubt are the schemes which promise the greatest advantage to the country; these small works, which are generally in tracts not adapted to larger works of irrigation, should not be neglected, but at the same time I should not in the least say that the large canals should be held back in consequence.

Mr. *John Cross.*

2880. How have those works in Ajmere, made by Colonel Dixon, been paid for?—By the Government entirely.

2881. Are

Mr. *John Cross*—continued.

2881. Are they supposed to be paying works? To some extent, the land revenue being dependent on them; I am not prepared to say how far they can be styled paying works; but they are essential to the well-being of the district, as well as to the security of the land revenue.

Mr. *Onslow.*

2882. Are those canals in the Himalayas capable of irrigating paddy fields, or is only millet grain grown in that portion of the country which you have been speaking of?—Both are grown.

2883. Is there sufficient quantity of water to irrigate rice fields?—That would be so at certain seasons of the year. The water is sufficient, so far as the country there has been reclaimed by the water-courses; but the country reclaimed is limited by the amount of water which is derivable from those sub-Himalayan sources.

2884. On that land can rice and wheat be both grown?—Wheat and rice are both grown, and barley also.

Mr. *Edward Stanhope.*

2885. None of those canals you speak of are available for navigation, are they?—None of those small canals. Before going on further, in looking through my evidence, I do not think I have expressed with sufficient emphasis the great value which I attach to the advantages derivable from the large canals, such as the Ganges Canal and the Jumna Canals. The extent of prosperity which has been conferred upon the districts through which they pass is very great in a general point of view, and the degree in which the people are preserved from the distress and privations of famine is beyond all calculation a benefit to the country. The advantage also which I spoke of before in saving land revenue which would otherwise be in arrear and lost, is also great. And further, there is an advantage in the country being protected, and being preserved from the deterioration which is incidental to land which is affected by famine; that is to say, being protected from the secondary effects of famine which are liable to continue for considerable periods after the famine itself has passed away. Altogether the general improvement and advancement of the Doab, which is due especially to these canals, is a matter which, apart from their immediate financial returns, cannot be overlooked, and must be borne in mind in determining the general advantages derivable from canal irrigation. I wished to put as strongly as I could, from long experience in those districts, both before and after their introduction, my sense of the great obligations which the people of the country stand under towards those great works.

Mr. *John Cross.*

2886. Quite irrespective of financial success?—Quite irrespective of that.

Mr. *Edward Stanhope.*

2887. I think you were desirous, were you not of expressing to the Committee your views as to the value of canals for navigation purposes?—I wish simply to say that in so far as navigation is attainable by those canals as a cheap mode of transit, the Government have kept that object steadily in view in all the designs which they have made for canals, and in the rectification of the old Ganges Canal. The Ganges Canal was originally

Mr. *Edward Stanhope*—continued.

Sir *W. Muir*, K.C.S.I.

4 July 1878.

made with the double object of irrigation and navigation. At the time it was under construction the Caubool War intervened, and the finances of the country were thrown into considerable disorganisation, and Lord Ellenborough in consequence put an embargo upon the procedure of the works of the Ganges Canal then in progress. Mr. Thomason strongly urged the immediate necessity of prosecuting the works, and Lord Ellenborough sanctioned a small sum, I think of two lacs of rupees a year, which was a mere driblet for that gigantic work, but upon the condition that navigation should be the primary object, and irrigation only secondary. This view was contested strongly by Mr. Thomason, who urged upon the Government that irrigation was the grand object of canals, while navigation should not be neglected; and when Lord Hardinge succeeded to the Government that view was accepted, irrigation being regarded as the primary and grand object of the canal, but navigation being still held to be a supplementary object of the undertaking. The Ganges Canal being a work on such a gigantic scale, was beyond all the previous experience of engineering officers, and it is not to be surprised at that a mistake was made in making the decline of the bed of it too rapid, and the consequence was, that two evils occurred: one was, that there was a scour in the bed of it, and the other was, that navigation was rendered extremely difficult, the current being so fast that it was almost impossible for boats to stem the opposing current, and consequently to be worked at a profit. During the time I was in the North Western Provinces, those evils had been very considerably remedied. At all the falls of the canal the dams had been raised so as to reduce the rapidity of the stream, and now the canal is being very fairly used for the carriage of grain and other materials, for the transport of which great rapidity is not needed. In the Report which I produced at the last meeting of the Committee, during the famine of 1868, in speaking of the rapid way in which dispatches of grain were moved about the country, owing to the sensitiveness of the market in reference to the rise and fall of price, it was said that in these operations the Ganges Canal was often the medium for conveying large consignments, its rates being so light that a very slight difference of price made speculation profitable.

Mr. *Onslow.*

2888. Was the grain carried in steamboats or in ordinary boats?—In ordinary boats dragged by men. In all the subsequent designs for canals great care has been taken to use the experience gained in the Ganges Canal to facilitate navigation, and any imputation against the Government of not keeping that as a main object in view is altogether unfounded. Large projects have been made in remodelling the Ganges Canal, for opening-up communication between the Ganges and the Jumna, and for in every way promoting navigation on the canal.

Sir *Joseph Mc Kenna.*

2889. Can you tell us what was the total vertical decline that had to be provided for in that canal?—I cannot give the exact fall per mile; but a slight excess with so vast a volume of water sufficed to produce the results which I spoke of.

Sir *W. Muir*, K.C.S.I.

4 July 1878.

Mr. *Edward Stanhope.*

2890. Have they in view steamboat navigation or navigation by small boats?—The navigation that they have in view is navigation by large flat-bottomed boats, which are dragged by men. We have tried steamboats on the canals, but, hitherto, without success.

Mr. *Ernest Noel.*

2891. Would the people not use them?—They have only been tried by the Government.

Sir *Joseph M'Kenna.*

2892. They were paddle steamers that were tried, were they not?—A screw steamer was the one which I referred to; it was difficult to manage its navigation in the canal, and it was disposed of to the Bengal Government. I may say that the Government have taken such interest in the matter that they have provided a flotilla of those flat-bottomed boats, which are used by those engaged in the traffic, paying hire for the same.

Mr. *Edward Stanhope.*

2893. The Government let them out to private traders?—Yes. The traders can also have their own private boats if they desire it.

Mr. *Ernest Noel.*

2894. Are they constantly in use?—Yes, constantly in use.

2895. And at remunerative rates?—No doubt, at remunerative rates.

Mr. *John Cross.*

2896. Can you tell us the rate which they charge for carrying grain?—I am not prepared to give the details.

Mr. *Edward Stanhope.*

2897. I think you have already given us your opinion as to the effect of those canals upon the health of the people; have you anything more to say upon that subject?—I have not said anything as regards the effect of the large canals upon the health of the people; and I should be prepared to say something upon that subject if the Committee wish it. I may mention, to begin with, that in the early laying out of those great works, the Ganges Canal especially, in the absence of experience no doubt sufficient attention was not given to the securing of the drainage of the country which would be affected by the canals. The canal passes through a part of the country which is, in many places, saucer-shaped, and the percolation from the canal, and the direct escape of water from the canal itself, or from the subordinate water courses, have allowed large accumulations of water to occur in various parts; and this in connection with the often excessive use of the water for irrigation has unquestionably caused in certain parts of the country a predisposition to fever and to spleen disease. This is very marked in the Saharunpore and adjoining districts, and in other parts of the Doab. On the West Jumma Canal great evils resulted there from similar causes. The canal, like other native works of the kind, followed the trough of the valley of the river, taking the lowest part of the country through which it went, and that, of course, aggravated very much the evils of percolation and the difficulty of draining the country as it became water-logged. On the West Jumna Canal especially, large tracts of country became water-logged, and suffered from efflores-

Mr. *Edward Stanhope*—continued.

cence of the white salt, called *reh*; villages were deserted over a considerable extent of country from that cause. Endeavour has been made of late, to re-align the course of the canal, and as far as possible to get it upon higher ground, so as to allow of the water being drained off to the lower parts; and upon the Ganges Canal considerable sums are now being yearly devoted to the same object of relieving the parts of the country which have become water-logged, and consequently removing the evils both to the cultivation, which arise from the water-logging of the land, and also to the health of the people. Against the advantages of the canals no doubt those disadvantages which are to some extent inherent in canal irrigation must be placed; but in putting the advantages as against the disadvantages, I should say that they are altogether to be outweighed by the advantages of the canals; and more especially as they are capable, to a very considerable degree, of being remedied, and are in course of being remedied so far as the circumstances admit. I may mention one case, the town of Saharanpore itself used to be before canal irrigation one of the healthiest places in Upper India. In consequence of the regulated escapes in the neighbourhood from the East Jumna Canal, the rivers flowing through the town were impeded in their flow of water, and the place became pestilential from fever, both to the native community and the European; works of drainage were set on foot when I was in the North West Provinces, and cuts were made to carry off the water, and those have been so successful that the town and vicinity have again regained their former reputation for being healthy. A similar case occurred on the banks of the Jumna. A little below the Sewalick range, one of the hill torrents passes over the canal, through the bed of it, and at a part of the country where there is a very rapid fall towards the river. In passing through the canal the torrent had to be held up to the level of the canal, and consequently on the river side of the canal there was a fall which gradually worked back by the scouring out of the ground till it became a very deep fall below the canal of, perhaps, 30 feet in depth. All the earth which was eroded from this place was carried down several miles towards the river, and formed a bar of earth which impeded the exit of the water of the torrent into the Jumna, and caused a wide expanse of several miles of water-logged land. The tract of country which had been a flourishing place before, with its village steads and flourishing fields, became absolutely depopulated. It became what was called the Sooltanpore swamp, covered with reh and overgrown with reeds and rushes, and bamboos, through which it was quite impossible to force your way. In order to remedy that the canal officers dug ditches and water ways through this tract of country, and, in the course of time, gradually the country which had been thus swamped was reclaimed, and where there were deserted villages and no trace of population at all, the country has been entirely reclaimed and re-inhabited, and it now flourishes as it was before. No doubt reclamation, to a very considerable extent, can, in a similar way, be carried out wherever the natural circumstances of the country will admit. I mentioned a part of the Terai in Rohilcund which was susceptible to similar influences of pestilential fever and climate, being drained into one which, being

relieved

Mr. *Edward Stanhope*—continued.

relieved of the excess of water, is now healthy. Other places have suffered very severely. The cantonments and the town of Meerut have unquestionably suffered very largely in consequence of impeded drainage from the Ganges Canal a few miles distant. Considerable operations have been in progress there for relieving that part of the country too as elsewhere, and the attention of the Government being directed very closely to this subject, I think that those evils will in the course of time be very materially ameliorated.

2898. How far do you think that the experience already gained will enable the Government in the construction of future canals to avoid those evils?—I think to a very considerable extent they they will be avoided, for the engineering officers now bear in view what was not sufficiently borne in view at first; that while they construct the canals remedial measures should be taken *pari passu* for clearing the country of the excess of water, and for not allowing any of those places to remain in which the water would be cooped up and unable to escape.

2899. Considerable additional expense will have to be incurred, I suppose, for drainage?—There is no doubt of that.

Mr. *Fawcett.*

2900. Are there not some parts of the country where from its natural configuration it is almost impossible to do this, where you can irrigate, but you cannot get off the water?—There may be; and there it would become a question whether artificial irrigation should be brought to that part of the country.

2901. But that is a constant complaint, as I daresay you have heard with irrigation in England, that you can get the water on to the land, but you cannot get it off again?—Yes, and the difficulty would be exaggerated, of course, in this country, where there is no dry season to dry up the water.

Mr. *Onslow.*

2902. Have those evil effects of which you have told us in those canals frightened and deterred the natives from using the water?—They have in no case deterred them from using the water; on the contrary, their disposition is always to use too much water; they are conscious of course of the evils of enlarged spleens, and attenuation, and predisposition to fever being connected with the over supply of water, but it has never lead them of themselves to avoid the use of water.

2903. In those villages which you say have been deserted, have means been taken to induce the people to come back again?—The means to induce them to come back are to drain the country, and immediately this is done the villages which were deserted are re-inhabited.

Mr. *John Cross.*

2904. Is it possible to take any means to prevent the excessive use of the water?—The Government have turned their attention very closely to that, and one means of doing it is this: The water is brought to the fields by little ducts, and where there is a large field to be irrigated a greater amount of water is needed, and considerably greater waste from the undulations of the surface, than where a small field has to be irrigated, and consequently regulations

Mr. *John Cross*—continued.

have been introduced for making very small squares, and obliging the cultivators to form the configuration of their fields requiring water into those small squares into which the water is brought, and the smaller the square the greater the economy in the use of the water.

Sir *W. Muir*, K.C.S.I. 4 July 1878.

2905. Can those regulations be satisfactorily carried out in many more cases than they are at present?—An endeavour has been made by the Government to do so, but the extent of country which is irrigated and the population concerned is so enormous, and the danger of putting power into the hands of the subordinate establishments to carry this out is so great, that it is hardly advisable to make your rules too minute and detailed.

Mr. *Onslow.*

2906. Do you mean by danger of subordinates the extortion of the native officers?—Quite so.

Mr. *Edward Stanhope.*

2907. Have you any opinion to give the Committee as to how far fixity of assessment has any effect in promoting the construction of wells or the adoption of other means of preventing famine?—I should like the Committee to avail themselve of the opinions which were expressed on that point by the late Colonel Baird Smith. When in 1860 and 1861, there was a famine in Upper India, Lord Canning deputed Colonel Baird Smith to examine the country, to test the efficiency of the relief works which were going on, and to report generally upon the effect of them upon the trade, and upon the general prosperity of the country. Colonel Baird Smith went over the country very carefully, and submitted a Report which is full of instructive matter, and of broad and large views on the subject. He was of opinion that, comparing the famine of 1861 with that of 1837, the range and the intensity of both famines were very similar; but the effects of the famine of 1837 were, beyond comparison, more disastrous both in the suffering of the people and the loss of revenue, and the long-continued deterioration of the affected districts. In the famine of 1861, on the contrary, the people were better able to bear up against the disaster, because the country had, in the interval, made very rapid strides in prosperity and in the accumulation of capital. He attributed that mainly to the long term settlements of 30 years, which had been introduced about the time of the previous famine; and during the currency of these settlements he showed that Upper India had made an extraordinary advance in prosperity, in capital, and in the substance of the people, and likewise in the advance of irrigation from wells, as also in prosperity from the progress of the canals in Upper India. Judging from the past he carried his views into the future, with the object of introducing still greater fixity, and advocated a permanent settlement of the land revenue as a means of advancing the country and of giving it a still more powerful backbone to resist those calamities of nature. Comparing those famines in Upper India with those in Bombay and Madras, the sudden manner in which, especially in Madras, the country fell before the advance of this great famine, may, possibly, to some extent, be ascribed to the system prevailing in Madras, which may not allow of the same amount of prosperity and of the same amount of accumulation of

Sir *W. Muir*, K.C.S.I.

4 July 1878.

Mr. *Edward Stanhope*—continued.

capital as in the part of the country where the settlement is upon a more fixed and permanent basis. The same system which, as Colonel Baird Smith showed, had promoted the prosperity of Upper India, and enabled it, in his opinion, to stand more successfully against the inroads of famine with less baneful results and with less continuing result of injury to the country, is being still carried on in Upper India, in so far that our settlements are now conducted in the same way for long periods of 30 years. I think that fixity of assessment is, without doubt, a material element which should, I submit, not be left out of view by your Committee in the consideration of this subject; in so far that in proportion to the value of property which is conferred by the long term settlements there is a sense of security which enables the proprietor to invest his money in improvements in the land, which improvements, when they take the shape of wells, for example, are a very material aid in enabling the country to resist the inroads of famine. I think that anything which affects the sense of security on the part of a proprietor in the fiscal arrangements of the Government is to be deprecated as impairing the motives which would lead him to invest his capital in the improvement of his land; and in this point of view I think that the recent arrangements, by which a new cess has been placed in an arbitrary way upon the land, in addition to the amount which was fixed at the settlement, must, to some very material degree, impair the confidence and security of the landholders in the arrangements which have been made by the Government, and in the degree in which it affects their confidence it will affect also their motive and desire to improve their property by such means as the sinking of wells. If the Committee wish to pursue the subject, I may mention that it formed the substance of a dissent which I submitted to the Secretary of State in Council, when these cesses were imposed. That Paper contains my views upon the matter.

2908. Do you think that anything could be done by loans to promote the construction of those works?—A very considerable amount may be done, and is being done in this way by the Government. The Government has always endeavoured to persuade the proprietors to take loans for this same purpose; and in the papers regarding this famine of 1861, reference is made to the very large extent of loans which were taken for this purpose upon the security of the land.

Mr. *Sampson Lloyd.*

2909. Were those loans taken by village communities or by individuals, or by whom?—By the landholders: possibly individuals, and possibly communities. Very considerable amounts were taken especially in the time of the famine.

Mr. *Ernest Noel.*

2910. For the construction of tanks as well as wells, or only for wells?—For wells. In some few cases also for dams or embankments to hold up the water. Tuccavee is the name which is given for it, and which has from of old been familiar amongst the people.

Mr. *Edward Stanhope.*

2911. What rate of interest is charged for those loans?—Formerly there was no interest demanded at all for those tuccavee advances; but it was thought to improve the system, and an Act was passed, the Land Improvement Act, and there it is now laid down that interest is taken; which appears to me to be almost going on a wrong principle, because whatever money is invested in the soil in this way adds to the revenue of the Government, to the productiveness of the land, and to the general prosperity; and the Government might very well afford to make advances of this kind to the limited extent to which the people are disposed to take them, repayable in a few years without interest; but interest is taken now. The object should be to stimulate the taking of such loans on due security for their being properly applied.

2912. At what rate?—I think it is 5 per cent.

Mr. *John Cross.*

2913. Are the loans invariably repaid?—Invariably. They are made upon the security of the land.

Mr. *Edward Stanhope.*

2914. What is your opinion as to the value of branch railways for the purpose of the prevention of famine?—I think that the advance of the railway system is one of the most essential means of preventing famine. In looking back to the famine of 1860, one finds that parts of the country which were extremely difficult of approach, such as Ajmere, are now, by being placed in railway communication with the North West, secured from famine. The approach to Ajmere was so difficult in 1868 that considerable arrangements had to be made by Government then for the import of grain. Grain was sent up from the North West, and advances were made to traders to supply their stores with the grain; but with all that it was extremely difficult to prevent the depletion of the market, and to keep it sufficiently supplied. Now that contingency would no longer exist, for any amount of grain could be thrown by the State Railway into Ajmere. I may also mention, as illustrative of that, the case of Rohilkund. Before the line of the Oude Railway reached to Rohilkund, in the early part of the famine of 1868, the district of Bareilly, which had not itself suffered, was tempted by the high prices ruling in the famine districts to a busy export trade, and so in the end it was entirely depleted of all its surplus grain, no famine being anticipated there at all; but at the close of that year, after the rains had commenced, and the roads and rivers had become impassable, and it was impossible, therefore, to bring back the grain again to Rohilkund, it was found that the country had been so exhausted of its stores that suddenly and unexpectedly the whole of the Bareilly district began to be in want, and the people in crowds to flock into the central city for support. It became then evident that the country had been cleared of its grain, and there was no way at once to bring it back. But, now that the railway passes throughout Rohilkund, and connects it with the rest of the Provinces, that difficulty could no longer exist. Similarly, in other parts of the country, in Bundelkund for example, I may mention Jhansi as a place where the famine in 1868 was very severe; it was extremely difficult, owing to the isolated position of the district, to supply it with grain. There is still no mode of reaching it directly, but by bad roads, and over a consider-

Mr. *Edward Stanhope*—continued.

able extent of country. But to connect Jhansi with the Doab is one of the works which the Government of the North West Provinces has proposed in its arrangements for branch railways. With these examples in view, there can be no possible doubt of the extreme value of a system of trunk and branch railways which shall connect all the outlying parts of the country, so that no part of the country shall ever be in such a position again as to be in the crisis of scarcity inaccessible, or nearly inaccessible, but shall be brought into close communication with the parts of the country where grain is plentiful.

2915. Then do you contemplate railways available for light goods traffic for that purpose?—Yes, for light goods traffic. I may take, as an example, the Muttra and Huttras Railway. This Railway was projected by myself; when I was in the North West Provinces, I found, on visiting Allyghur and Hattras, that the merchants there were very much discontented by the great *entrepôt* of Hattras, which is a large corn mart, being far off from the line of railway. The East India Railway was laid out as railways were originally laid out in India, in direct lines, with no sufficient reference to the marts and cities near which they should pass, so as to make them as direct and short as possible. It was a mistake not to have subjected them to some modified divergence from the direct course to those large marts on the right and left of the line. It became a matter of great inconvenience to this mart of Hattras to be about six miles away from the railway, and I found the merchants extremely desirous of having their city connected with the railway by a branch railway; and in considering the project I was desirous not only of joining Hattras on to the railway, but of projecting the line still further on to Muttra, and thus the railway was extended to a length of about 24 miles. The merchants connected with the neighbourhood were so anxious for the undertaking that they offered to contribute towards it, and thus the money was raised partly by loan from native capitalists of the vicinity, and also by advances from the provincial balances. The line cost about 10 lacs, of which about 3 lacs were provided by the contributions from the people themselves, and the rest from the provincial balances. The work has been carried out, and is now successful, and yielding over four per cent.; and I think that these works may, with great advantage, be carried on in a similar way. There is another which has been made since from between Ghazeepore and Zumania, on the East Indian Railway, and a third is now being carried out between Cawnpore and Furruckabad, and a similar project has been submitted from Bengal, between Patna and Gayah, at an estimated cost of about 30 lacs, of which it is proposed that about 14 may be raised by the people themselves. For the Ghazeepore work, the entire amount of which was estimated at five lacs, and over that amount was subscribed by native capitalists. So that the opinion which was mentioned here to you, I think by Sir George Campbell, that native capitalists would be unwilling to come forward, is not altogether consistent with the fact which I have just mentioned.

2916. Are there many instances, besides those two which you have mentioned, where native capitalists have come forward?—The idea is entirely new. I believe the first occasion on which native capitalists were invited to come forward to contribute to such works, was in the case of the Hattras and Muttra Railway, which I have mentioned. I should like to put in, with reference to this Hattras and Muttra Railway, some papers which would illustrate the conditions on which the natives have subscribed and the interest which they are shown to have taken, a place being reserved for representatives from amongst their number on the Board of Management, which shows, that in point of fact, they are interested in these works, and prepared to contribute towards them.

Sir *W. Muir*, K.C.S.I.

4 July 1878.

2917. What is the nature of those papers?—They show the origin of the project and the manner in which it was first offered to the public in the North West, the terms upon which the money has been contributed, the fixed interest the contributors are to receive, and the degree in which they will share in the surplus profit in proportion to the capital which they subscribe. They are to get a share of the surplus profits in proportion to the capital subscribed by them.

2918. Those railways, as I understand, are made without any guarantee by the Government?—They are of the nature of State railways made from the provincial funds. They may be made from three sources: they may be made from the balances to the credit of the provincial government; they may be made partly from that source and partly by loans from native capitalists, and also from loans by the Government of India to the provincial funds. If the Government of India advance money to the provincial governments, they will be charged at the rate of 4½ per cent. for the same.

2919. How is the native capitalists' interest secured?—He gets four per cent. certain guaranteed by the provincial government.

Mr. *Ernest Noel.*

2920. That would be a first charge on the railway, I presume?—Yes, a first charge on the railway. These are the rules regarding the Muttra and Hattras Railway, and they have been taken, I believe, as a type for the rules in other similar works. Hereafter it may be expected that, as the idea becomes familiar to them, native gentlemen may subscribe to such works on still more favourable terms.

2921. You think that, hitherto, the natives have not been sufficiently encouraged to subscribe to works of that nature?—The experiment had not before been tried.

Mr. *Edward Stanhope.*

2922. The Government of India now entertain, do they not, some considerable expectation that they will be able to induce the native capitalists to come forward?—There is that expectation to some considerable extent, and it will have the double benefit of providing funds and of interesting the natives in the management of such works, and also the political advantage of having natives to be creditors of the Government.

2923. You alluded to one of those modes of constructing a railway, namely, out of provincial funds; how far do you think that the best mode of carrying them out?—I think that provincial funds could not be better invested where there are surplus balances than in such local and minor works as I have mentioned, and also the small sub-Himalayan canals. As regards the extension

Sir *W. Muir*, K.C.S.I.

4 July 1878.

Mr. *Edward Stanhope*—continued.

sion of the decentralisation scheme, I think that it has, in one direction, been carried too far by transferring the great canals to the responsibility of the provincial governments. It seems to me that these gigantic works are in themselves Imperial concerns, the benefits of which are not confined to the localities where they exist, but that they are works required for the benefit and security of the whole Empire. For instance, the Ganges Canal or the Baree Doab Canal in the Punjab, provide an enormous store of grain which is ready for export to any distressed Province, and which, for example, was of essential value in the famine of 1874, in Behar. The whole of the upper part of Behar was then supplied by the produce of those canals. Similarly in the present famine in Southern India the surplus produce of Upper India secured to a great extent by those canals, has served to supply the famishing population with stores of grain. Giving the canals over to the provincial governments, and making them responsible for them, has this disadvantage, that interests of the empire may suffer from these works being regarded from a local and not an Imperial point of view; the construction of a great work like a canal carrying with it those large Imperial advantages which I have referred to, ought to be undertaken, not with regard to the special funds at the disposal of a provincial government, or its inclination to assume the responsibility of its construction and maintenance, but with regard to the larger question of whether the Imperial Government, as a whole, can afford to carry out a project of the kind, and whether, as such, it would be a benefit in an Imperial point of view. I think, therefore, that in so far as the great canals are concerned, the decentralisation of them, and the transferring of them to the responsibility of the local governments, has been a mistake; and, further, that it must unsettle the financial operations of those provincial administrations, because the income from canals is liable to extreme fluctuation; in a good year a very large revenue will be derived from them, and in a bad year the fluctuation might be so great as to place the local governments in considerable difficulties with a large deficit. Also, as I have shown in the earlier part of my evidence, the land revenue and the profit from canals are closely connected the one with the other, the indirect profit is, in point of fact, an integral part of the land revenue; in transferring the canals to the provincial administration, you can, therefore, only transfer the direct receipts from the canals. It is impossible to transfer to them any part of the indirect profits of which mention has been made, because they are essentially part of the land revenue. And, therefore, it seems to me that when you transfer a work like a canal to a local administration, you transfer a work of which it is impossible to make a fair debtor and creditor account with the local Government, or even to say what the exact profit is. Those objections do not attach to such works as short branch railways, which, I think, are extremely suitable for provincial responsibility. I should wish to say, also, with regard to this matter of provincial responsibility, that whilst approving most highly of putting as much personal responsibility as possible upon the several local administrators, it appears to me that their financial power and functions have been immensely advanced without any corresponding security for such power and functions being safely and steadily discharged. The entire power of managing the provincial revenues vests in the person and discretion of the Lieutenant Governor alone, and I think that with such enormous responsibilities as are now placed upon him there ought to be some mode of strengthening his position and of steadying his action. Where you have a single administrator in an office exposed to frequent successions, and liable, from personal predilections, to press one department or one set of works to the prejudice of another, and to commence works without the careful deliberation and judgment which such projects demand, with reference to the prospective burden both in the province and the Empire, and possibly liable also to idiosyncracies and crochets, there ought to be some responsible council, or body of constitutional advisers, attached to him, by which uniformity of action should be preserved, due deliberation guaranteed, and the advantage of a steady fly-wheel given to the administration. My objections to the removal of canals from the control of the Government of India, and likewise to the inadequacy of the provincial machinery to cope with its increasing responsibilities, were recorded in a Dissent, in which my views were stated at length. If this Committee wished to pursue the subject, the Secretary of State might, perhaps, give them this Paper.

Mr. *Edward Stanhope*—continued.

2924. I understand the general effect of your evidence to be, that you think it would have been desirable if the central government had kept the administration of canals in its own hands entirely?—Yes, quite so; I mentioned the other point, because large financial and public works schemes are being promoted by the Government of India on the so-called responsibility of the local governments; but that responsibility may not be a real responsibility. The Lieutenant Governor is the nominee of the Government of India, and the action may be that of simply transferring the responsibility from the Government of India to a nominee of the Government of India, who, acting under its immediate orders, may become merely a new department of that Government, so that the centralisation may, under this system, be even more firmly rivetted than before, and yet appear under the guise of local responsibility. In so far as the personal responsibility is really exercised, then I hold that the Lieutenant Governor should be supported and steadied by the help of responsible counsel; in so far as it may be merely a nominal transfer, then there is a danger of measures being insufficiently dealt with, the responsibility falling between the two stools. The proceedings of provincial Governments elude publicity also, and the check of outside opinion and discussion, more than those of the Government of India. In advancing loans, for example, to the Local Government, the Government of India may be merely "robbing Peter to pay Paul," the eventual responsibility being, as before, with the Imperial Government, and not in reality shifted to the Local Government. There is thus a risk that in those large undertakings in which money is being raised and administered, the so-called responsibility of the local government is being exercised in a manner which is dangerous, because there is no sufficient security, and no sufficient consultation, and care, and check, which would otherwise attach to the proceedings

Mr. *Edward Stanhope*—continued.

proceedings if they were conducted on the responsibility of the Government of India; in so far I thought it necessary to bring the subject before the Committee.

Mr. *Onslow.*

2925. Is it only as regards canals that you would recommend this extra council?—By no means; I do not wish that at all with regard to canals, the conduct of which, as the Chairman just now said, should be with the Government of India. It is with regard to the general extension of provincial responsibility in respect of branch railways, and other works upon which local capital is being expended, and loans being raised for the improvement of the provinces.

2926. Then that council which you would recommend would be a financial council as much as anything?—I think that such a body would be necessary to aid the Lieutenant Governor in a stable and efficient financial control.

Mr. *Edward Stanhope.*

2927. It comes to this, that you think the constitution of the local governments is not such as to enable them so fitly to deal with canals?—To deal with canals and also to deal with other works, such as branch railways raised from capital and provincial revenues, the power is one which should be accompanied by some strengthening and steadying of the action of the local government so as to give greater security in the choice of works, in the administration of works, and in the general conduct of the so-called local responsibility.

Mr. *Onslow.*

2928. You have your local officers under you now; you have your local engineers, and you can consult them; you have your local revenue officers and you can consult them; but you would wish to have something superior to that?—The *personnel* of the Government at the head of it does not appear to me to be constituted at present in a manner capable of adequately dealing with such great responsibilities. The point is that the powers have to be administered at the discretion of a single individual.

Mr. Edward Stanhope.

2929. Have you any opinion to give as to the possibility of employing natives more extensively in public works?—I think that in public works the Government has done, and is doing, what it can to employ the natives. It was one of those things which occupied the attention of Mr. Thomason, and at the time when large works were being conducted on the East Jumna Canal and on the Ganges Canal, he established a school for the education of the natives, and when the Thomason Engineering College at Roorkee was set on foot, native classes were established there, and one especial class for the education of natives as engineers of a superior class was constituted, in which six scholarships of 60 *l.* a year were provided for them. It was not found to be popular amongst the natives at first, but latterly, that is within the last few years, it has, I believe, become so; at first those scholarships were not taken advantage of, but latterly they have been fully taken up; and gradually, I believe, that natives of India will arise who will be qualified for responsible employment in this department; but, as a rule, hitherto it has been difficult to find such.

Mr. *Fawcett.*

Sir *W. Muir*, K.C.S.I. 4 July 1878.

2930. Do I understand you rightly that you think that where there is a permanent settlement famines are much less severe, and irrigation works have a much greater chance of working successfully?—That was the opinion of Colonel Baird Smith, and as such I mentioned it.

2931. I understood that you quoted that opinion with the intention of conveying to us the idea that on the whole you endorsed it?—I quoted it as the opinion of a person who had given great attention to the subject, and whose opinions were entitled to weight; and also I hold and intended to say, that in so far as fixity of demand, and consequent security in the possession of a valuable tenure is given to a landowner, so far, no doubt, the position of the country is improved, and enabled to resist famine; and in so far as that security and faith are impaired by the arbitrary imposition of cesses to meet Imperial deficiencies, in so far the great benefits spoken of are abated. I should wish that to be regarded as my view.

2932. But the permanent settlement does not in the slightest degree give any security as to fixity of land so far as the great body of the people, the cultivators, are concerned; all that the permanent settlement does is to create a certain proprietary class who occupy the position of the officials, and who can practically extract any rent that they like from the body of the people, the cultivators, on whom the famine necessarily falls?—A considerable portion of the community in Upper India are proprietary cultivators, and to them that argument would not apply.

2933. To the permanently settled district of Bengal it does apply, does it not?—Very largely, no doubt.

2934. The mere fact of the permanent settlement does not in the slightest degree give any additional security to the cultivators who have a landlord or a proprietor who may be far more grasping in his demands put over them instead of the Government, who can adjust the terms if they like so as to suit the people?—I think, speaking from experience in Upper India, as to the question of settlement, that when a new settlement is coming on, there is a very great feeling of anxiety and a very large amount of doubt, and a sense of insecurity arising from the impending new settlement, and that is productive of evil.

2935. But the permanently settled districts in Upper India that you have referred to, do show it in this way: that in consequence of permanent settlements, famines, when they have occurred, have been less severe in their effects?—I am far from having said so.

2936. I understand that you have put in a memorandum from Colonel Baird Smith, which you thought was worthy of the attention of the Committee, and that you were going to put that paper in which I fear we may not have a chance of examining you upon, rather advocating the same opinions as you have quoted as being those of Colonel Baird Smith?—I said that I endorsed the opinion of Colonel Baird Smith, that in so far as the North West Provinces have since the famine of 1837 had a settlement, not like the previous ones liable to frequent change, but a settlement fixed and unalterable for a term of 30 years, that settlement had enormously developed the resources of the country, and improved the North West Provinces, and given

Sir *W. Muir*, K.C.S.I.

4 July 1878.

Mr. *Fawcett*—continued.

it ability to withstand in some degree the shock of drought. I do not wish at present to go beyond that, but merely to say that in so far as I believe that to be a fact, and in so far as I hold that the country was benefited and strengthened by the long settlement, so far anything which affects the fixity of demand during the currency of such settlement is an evil.

2937. But I think from your employing the expression "fixity of tenure," if I am right, that would give the idea that you were advocating a permanent settlement, and not a long settlement such as now prevails in the north west, which is a settlement of 30 years; there is the most essential difference possible between a long settlement and a permanent settlement, is there not, inasmuch as in the one case the Government simply surrender for the time a prospective improvement of the land, and in return for that surrender, they get the advantage of encouraging a greater amount of capital being spent in its cultivation; whereas, with regard to the permanent settlement, they surrender the prospective improvement for ever, and hand the cultivators over to a class of proprietors instead of keeping the development of their interests in their own hands?—The question of permanent settlement is a very large one indeed, and I have my own opinion upon it; but perhaps it would be departing from the object of the Committee to enter upon that. If it is desired to enter upon that question, I should be prepared to put my views before the Committee; but I may say that to a considerable extent I quite concur with you, and any system which I should advocate would be one which should not debar the Government in perpetuity from profiting by a rise in the standard of rent, and a general increase of property in the country.

2938. What the Committee then is to understand is that the kind of settlement which you were advocating, in order to diminish the effects of famine, was not a permanent settlement such as prevails in Bombay, but some settlement of a long period, such as that which prevails in the North West?—What I should regard as the saving principle of a settlement is that which has been adopted in Bombay, namely, that at a new settlement, the increase of the land revenue should be fixed, not with reference to increased value due to individual energy and investment of capital, but to general considerations, rise in value of land or prices, increased facilities of communication, and consequent rise in the scale of rent, and such like considerations.

2939. Then you advocate a settlement which is possible of revision at successive periods, taking those elements which you have just enumerated into consideration?—I do.

2940. With regard to your objections to the decentralization scheme, as I understand, you attribute great importance to the fact that a public work is, more or less, for the benefit of the whole country, and that the burden of it, if a loss, should be associated in carrying it out, should not be thrown upon the taxpayers who happen to live in the particular locality through which it passes?—As regards the great canals that is my view.

2941. Have you considered this point with regard to the decentralization scheme; is there not this danger associated with that scheme, that you may possibly allow under it a great system of local taxation to grow up which will not arrest

Mr. *Fawcett*—continued.

public attention, and consequently will escape public censure more than the imperial taxation does?—That might be so, and also the growth of a great system of local debt and expenditure, in the absence of local councils.

2942. At the present time those local councils do not exist?— They do not exist.

2943. But the possibility of local taxation does exist?—Yes, the possibility of local taxation with the assent of the Government of India does exist.

2944. With regard to the employment of natives, you referred to the establishment of a college in India, with the special object of giving an opportunity to natives to be employed on public works; is that the college of Roorkee?—The college at Roorkee, named after its founder Mr. Thomason.

2945. Has not the position of that college, which was designed with the excellent object of giving the natives employment on public works, been materially affected by the establishment of Cooper's Hill?—Their prospects, no doubt, have been to a very material extent.

2946. As you were so long Lieutenant Governor of the North West Provinces, can you tell us how many students were at the Thomason college at Roorkee before the establishment of Cooper's Hill, and how many there are now?—I could not give the number. There were a very considerable number in the subordinate classes.

2947. The number of students has very greatly diminished, has it not?—I believe not.

2948. The number of students has very greatly diminished who would at all come into competition for the same kind of employment on which students at Cooper's Hill, where there are young engineers, are engaged?—I think you must refer to the English officers, and to the English and Eurasian students, and not to the native classes.

2949. I refer to the natives?—I do not think that the native classes have diminished.

2950. Not for such employments?—I think not. My impression is, though it does not come down to the last year or two, that the higher classes for the assistant engineers have been filled, and that the full number of special scholarships which I mentioned, which are six, at 60 *l.* a year, have been, during the last few years, taken up by them for the first time for many years; so that my impression is that the number of students has not been affected, at least so far, by Cooper's Hill.

2951. There are very few students there now, are there, except those who hold these scholarships?—There are a very large number in the subordinate classes.

2952. I am comparing the effect of Cooper's Hill in diminishing the chances of natives obtaining first-grade employment; I believe you will find that there are very few students at Roorkee now, except those who are holding scholarships, and who therefore may be described as being paid to be there?—I should suppose that there are as many now as there were before, and that the number of native students has not been affected so far by the establishment of Cooper's Hill, and that if the natives qualified themselves for employment on public works, they would be employed by the Government on the works.

2953. There is this difficulty in the way, that hitherto a number of students have been sent out from Cooper's Hill each year; the moment they

Mr. *Fawcett*—continued.

they are sent out they receive a salary, and whether they are doing work or not, the Government have to pay them this salary; and therefore, as a matter of course, the Government consider that they have the first claim for employment; and consequently if the employment which is given is not more than sufficient to employ those young engineers sent from Cooper's Hill, it necessarily follows that the natives get no employment at all of that kind, although they may get subordinate employment?—In so far as the Government is well supplied elsewhere with agents, no doubt the demand for natives hereafter will be somewhat diminished.

2954. But what the establishment of Cooper's Hill has practically done is this, it is said that we will guarantee employment to a certain number of students who pass a certain examination at Cooper's Hill, which is an English college; and Englishmen have naturally a better chance of succeeding in this examination at Cooper's Hill than natives, because the natives are handicapped with the disadvantage of having to travel 5,000 or 6,000 miles to enter the examination, besides the expense and trouble that are involved, and consequently it has been found that the number of students who are annually sent from Cooper's Hill has been sufficient to meet the requirements of the Public Works Department, and that necessarily reduces the chances of the natives in India of obtaining employment of the first grade on public works almost to nothing at all?—It may eventually, but I do not think it has had that effect hitherto.

2955. I will put to you now a question on the general finance subject, because to what extent public works can be carried out in India, or public money, which is the distinct term of our reference, must depend upon the financial position of India to a certain extent; that is one element in deciding it, is it not?—Yes.

2956. You have expressed the opinion, I think, very repeatedly, that there are many circumstances connected with the financial position of India such, for instance, as the possible loss which has already been inflicted upon her by the depreciation in the value of silver, the increase in military charges, and other circumstances, which render her financial position so critical that it is not likely she will have any margin with which to pay the loss on public works?—Yes.

2957. And therefore you would consider, would you not, judging from the past, that whether a public work pays or not is a matter of very great uncertainty, that you cannot tell beforehand whether any particular public work that is carried out in India will or will not pay; it is a speculation of a somewhat hazardous kind?—There is some uncertainty unquestionably attaching to it, but upon the average you may assume that an income will be derived sufficient to meet the interest of the capital sunk in the works.

2958. But has it not again and again happened, in fact in almost every instance in which a public work has been constructed that has not paid, that at the time of its construction estimates were laid before the Government which most confidently asserted that it would pay, and therefore what has happened in the past shows that we have no security for what will happen in the future?—It is possible, undoubtedly.

2959. Is it not the case with regard to existing irrigation works, that although some of them pay remarkably well, yet a great number of them from which the most profitable results were anticipated pay nothing at all, or at least not directly?—That has not been my experience in Upper India; I have no personal experience of the works to which possibly you allude, such as the Orissa Canal.

Mr. *Fawcett*—continued.

Sir *W. Muir*, K.C.S.I.

4 July 1878.

2960. With regard to works which, when you were Finance Minister, I have no doubt (without ascertaining the causes) must have been brought under your notice, is it not the case, taking a great number of the irrigation works, in fact almost all them in Bengal, that they do not pay interest on their outlay; without of course saying what advantages they may confer upon the country in an indirect way?—I think, looking to the indirect revenue, and the direct returns, that they are profitable for the country.

2961. But looking at it as regards the direct returns they do not pay, I am not speaking of whether they are advantageous to the country; but looking upon them now purely as a financial question, can you from any account that have ever been produced, show that they pay interest on their capital?—Perhaps not entirely; but they are in progress of extension and development; and when fully at work, and the irrigation derivable from them developed, as it certainly will be, I have no doubt that upon the whole, and taking into consideration both the direct and indirect benefit to the revenues, they will be successful even in a financial point of view.

2962. But you are aware that since you have been a member of the council of the Secretary of State, the finance of India has been brought under your notice, and it has been stated by the late Secretary of State for India, and also by the Under Secretary of State for India, that there was, so far as they knew, not one single irrigation work in India which had been carried out entirely by the English which secured the satisfactory result of a clean balance sheet; within the last three months the Under Secretary of State produced accounts from his place in the House of Commons which showed that 9,000,000 *l.* had been expended on irrigation work chiefly in Bengal, and that on that outlay there was not a return of half per cent.?—Many of those works have not yet begun to bring in returns at all, and it is quite open to you to make that criticism; but I should think it a severe and harsh one as regards the benefit of irrigation works, even in a purely financial aspect.

2963. It is not my criticism; I am quoting the exact words of the Secretary of State and the Under Secretary of State; therefore it is an official opinion and not mine; I have never ventured nor have I the materials at my command to make the calculation?—From whatever source it emanates, I should regard it still as an unwarrantably severe criticism.

2964. With regard to State railways, they have not been carried out sufficiently yet, have they, to enable any certain opinion to be formed of their financial results?—I think that, so far as the State railways have gone, it is almost certain that the results are financially satisfactory.

2965. Can that be proved from figures?—I believe it can.

2966. But you have not the figures here?—I have no figures by me here; but there can be

Sir *W. Muir*, K.C.S.I.

4 July 1878.

Mr. *Fawcett*—continued.

no doubt that the Rajpootana Railway is a decided financial success.

2967. But with regard to irrigation works, do you think this would be an unfair conclusion, that however advantageous they may be to the country, yet their financial results are so uncertain, judging from the past, that in carrying them out with borrowed money you are not certain that you will obtain from them directly a sufficient return to pay the interest on the money borrowed?—That undoubtedly has been the case with many works, but I think that with due precautions for the future, and checks against the setting on foot of works which are insufficiently estimated for, both as to their cost and returns, that ought not to be the case for the future. At the same time, I agree so far that it would be unadvisable to sink any very large amount of capital rapidly upon those works. I think that whenever profitable designs are brought forward it is for the great benefit of the country, and not financially unprofitable, to go forward with those works in a moderate degree, but I should object entirely to a course which would imperil very large amounts of capital in such undertakings.

2968. Considering the extreme difficulty, which I think you often refer to in those financial statements of yours that I have read, of increasing the revenue of India, you would generally advocate a like policy of caution with regard to public works, and that any public works which would be perfectly justifiable to be carried out if there was a surplus of revenue over expenditure, might entail too great a risk upon the finances of India to be carried out if they had to be carried out with borrowed money?—I think that view would be just.

Mr. *Onslow*.

2969. When you were Foreign Secretary to the Government of India, was there any communication made to you as Foreign Secretary regarding the probability of native rulers acting in conjunction with the Government in assisting them in carrying canals through their territory?—Not while I was Foreign Secretary.

2970. Are you aware, when you were not Foreign Secretary, of any communications having been made?—The Agra Canal is partly connected with the Bhurtpore State, and as such the Bhurtpore State has been declared by the Government of India entitled to take advantage of the irrigation from it; but excepting that case, and that of the Sutlej Canal, which has been described by General Dickens or Colonel Crofton as to the financial arrangements between the Government of India and the native States, I do not think that the question has arisen in any other case that I am aware of. Jeypore has very considerable public works in his State, but I do not know that any communication of the kind you refer to has been made by the Government in respect of him.

2971. With regard to those canals in Jeypore, are the works under the supervision of European officers or native officers?—I have not sufficient information regarding them. There is an English engineer in Jeypore, but I do not think the system of irrigation has been carried to any great extent there.

2972. I would ask you this question generally: From your knowledge of the native rajahs, do you think that they would have any objection to

Mr. *Onslow*—continued.

carry out some general system of irrigation, and irrigation through their several districts?—I think that anything which they would regard as advisable to be done in respect of irrigation they would do themselves, irrespective of any motion from the Government of India.

2973. I am talking of a scheme which might be promulgated by the Government of India, a portion of which scheme would perhaps have to go through a native rajah's state; do you think that there would be any objection raised on the part of the rajah on account of the work being under the Government of India, and not under his own officers?—Such a case has not occurred, and I prefer not to give an opinion until it does.

2974. Do you think, from your knowledge of the native rajahs, that there would be any objection on that score?—It is really a question which I should feel a difficulty in answering, the case not having occurred. I should think that they would prefer themselves to carry out works of that kind with their own resources, and I should not advise any general system which would include them; in fact, I know of no case where the remarks you have made would be applicable to the native states.

Mr. *John Cross*.

2975. I think the honourable Member for Hackney asked you to express an opinion as to the economy of employing native engineers; do you suppose that there would be any saving in the construction of such works by employing native engineers rather than English engineers?—If we had a large staff of well-qualified native engineers, their allowances would be of a lower character than of those whom we are obliged to import from England; and the result would, as has been said by Mr. Fawcett, no doubt tend to economise the construction of the public works, but unfortunately we have not yet got the agency which is spoken of to any sufficient extent.

2976. Do you think that the simple cost of an engineer for his advice and his supervision would form a very material element in the cost of a public work, so as to make the difference between a work paying and not paying?—It would make a difference, but, perhaps, as you suggest, the proportion when compared with the aggregate cost of labour and materials, would not be so great as (apart from the obligation devolving upon us to employ natives of the country as far as they are so qualified) to be of very essential moment.

2977. Would not it be a very immaterial proportion of the cost?—I should not say that it would be very immaterial, but it would be comparatively small.

2978. I think you said that the railways originally were laid out in such a manner as to miss the large towns, and were laid out in perfectly straight lines; that system, I understand, is not continued at present in the construction of railways?—Certainly not; it was found to be a mistake, and that the marts which were left out were at a great disadvantage, and now the system is to take up every main point of traffic in the various parts of the country traversed by a railway, even if it does involve some divergence from the direct line.

2979. You spoke of the objection to transferring the administration of canals to the localities; does that objection attach to the transfer

of

Mr. *John Cross*—continued.

of small irrigation works?—Certainly not; not such as I spoke of in the Bhabur tract.

2980. Do you mean to apply that remark to navigation canals only, or to irrigation canals also?—Generally to all the great irrigation canals, navigation being always a subordinate object.

2981. You consider that canals for navigation purely are very subordinate to canals for irrigation?—I think that in every canal, where it is possible to do so, advantage should be taken of the facilities for navigation; but the primary object, no doubt, in a country like India, should be irrigation; the other should follow as ancillary and subsidiary to that.

2982. Then you do not quite agree with Sir Arthur Cotton in his estimate of the great advantage of navigation canals over railways?—Certainly not.

Mr. *Hardcastle.*

2983. With reference to the employment of native engineers, apart from the mere question of salary, do you think that a native engineer is as competent an engineer as an English officer sent out from Cooper's Hill?—Hitherto it has not been the case. By education we may hope that a class of native engineers will be trained and instructed who shall combine the accomplishments of European engineers with some degree of their energy, self-reliance, and promptitude; up to the present time that class does not exist. It has been the object of the Thomason College to draw out such a body of natives, but it must be confessed that hitherto the experiment has not been successful. Although a very large number of the subordinate classes of artificers and workmen have been educated there, and they have proved exceedingly useful, yet we have a very small number that qualify themselves for the upper engineering grades.

2984. Do you not think that the saving of mere salary might be counterbalanced by the increased cost arising from the want of sufficient knowledge on the part of those native engineers, such as they are, for their employment?—It would be impossible to employ them at present, because, as a class, they do not exist.

Mr. *Ernest Noel.*

2985. And therefore you have no knowledge that those works would be more cheaply carried out by native engineers rather than by Europeans?—Excepting the general presumption stated by another honourable Member, that the employment of the native and indigenous agency of the country must be cheaper than that imported agency.

2986. As regards salary, is not it the case that the great cost of a work is not the superintendence (that is but a very small item), but would native engineers be likely, or have you any evidence which would tend to convince you that native engineers would carry on a work more economically than English engineers?—I do not suppose that that would be contended.

2987. I suppose one reason why there are comparatively few students of the higher class at Roorkee is, that there are not many who possess sufficient means to go there unless they have scholarships?—I do not think that that is altogether the case, although it may be partially so. I think it is rather the case that engineering studies and employments are not popular among the natives, or as yet congenial with their tastes.

Mr. *Ernest Noel*—continued.

The higher employment in the public works is not a branch of the public service which they have as yet taken naturally to.

2988. You were speaking of the formation of irrigation tanks; if those tanks were liable to be dry in times of drought, I suppose they would rather tend to increase the severity of famine if one occurred, by their having been the means of increasing the population previously?—As far as the population is increased by their existence, in so far no doubt they would add to the intensity of the famine in the district.

2989. That is to say, if they were not supplied in some way with water during times of severe drought?—Yes; but then again, on the other hand, a long continuance of prosperity in the country adjoining such tanks would tend to the accumulation of capital and property in the vicinity, which of itself would give a power to some degree of resisting, at least, the first inroads of famine.

2990. Do you know at all what proportion of the cultivators in the North-west are proprietors; is there any means of learning that?—The information is derivable from the Settlement Reports, and could be given.

2991. In Bengal the greater proportion of the proprietors are not cultivators, I think?—That is so.

2992. In the North-west do you think that that would be reversed?—Not reversed, but a very considerable number of the cultivators are proprietary cultivators.

Mr. *Agnew.*

2993. In judging generally of the value to India of the works of irrigation, you would consider, would you not, the indirect results in the increased prosperity of the inhabitants of the irrigated districts, and the payment of revenue which would otherwise not be paid, as well as the mere financial results?—Quite so; and they are very essential advantages.

Mr. *Ashbury.*

2994. Supposing that the native engineers were employed by us in the preparation of the plans for extensive works, of course, their recommendations would have very great weight in giving out contracts; but do you think there would be any danger, with such vast powers as they would possess, of such native engineers receiving commissions from sub-contractors?—I think that with the progress of education, and the creation of a respectable class of accomplished engineers, that danger would not practically exist.

2995. But as a matter of fact, up to the pretent time, have you any knowledge or suspicion that such practices may have prevailed with native engineers?—We have had so few native engineers of the class that has been contemplated, that it is impossible to say; I have met with no case in which a native engineer of a grade corresponding with that of the European officers, has been accused of such practices as you mention.

Mr. *Childers.*

2996. Would you be good enough to explain to us what is the official routine when a public work is proposed to be undertaken, we will say, first under the management and responsibility of a presidency government, or of a local government?—

Sir *W. Muir*, K.C.S.I.

4 July 1878.

Mr. *Childers*—continued.

ment?—The local government, if it considered a project to be desirable, would first have it designed and surveyed, and some estimate made of the cost of it; and it would then make an application to the Government of India, laying the project before the Governor General in Council, and proposing the ways and means by which the work should be accomplished, whether by Imperial funds or by provincial balances, or as has been recently the case partly by provincial balances and partly by local loan. The Government of India would then express its opinion upon such project, and give its sanction or withhold it, as the case might be; and if it were sanctioned, they would supply the funds that were necessary for carrying it into effect.

2997. That is to say, if those funds were Imperial funds?—Yes.

2998. And where those works would be entirely constructed from local loans or local funds, would the routine be the same?—The routine would be the same up to a certain point. There are rules laid down where the work is a comparatively small one; that is to say, where its cost does not exceed 10 lacs, 10,000*l.*, or with the establishment, of 12,500*l.*, which, I think, is the limit laid down. In that case, the subsequent carrying out of it is left more to the discretion of the local government; but the first steps would be the same under all circumstances.

2999. When a proposal reached the Government of India, would it be dealt with in the Finance Department as well as in the Public Works Department?—It would be dealt with primarily in the Public Works Department, but if approved and sanctioned there, no measures would be taken with respect to the financial arrangements, whether local or Imperial, without the cognizance and concurrence of the Financial Department.

3000. Is that the case, then, with respect to the smaller railway extensions, for instance, that have been going on lately, that both the Public Works Department and the Finance Department in the Government of India have always been consulted?—They have.

3001. And when their judgment has been pronounced, and the Governor General has arrived at a decision, is that all that is necessary?—All that is necessary with respect to inconsiderable works; but above a certain expenditure that would require the sanction of the Secretary of State.

3002. Do you remember the limit to which the sanction of the Secretary of State is necessary?—I cannot state it at this moment.

3003. Is it necessary in that case to have a legislative Act for public works of that character?—No, not necessarily.

3004. So that the discussion goes on, and the sanction is given inside the walls of the public offices, and there is no public discusssion of any sort of the matter?—There is not.

3005. Where a work is not to be carried out under the responsibility and management of a local government, but directly under the Government of India, what is the routine then?—The routine in that case would be that the project would be, in the same way as in the other case, designed or proposed probably by the local government, or it might be originated by the officers of the Government of India itself, and it would, probably, be discussed, first, in an inchoate

Mr. *Childers*—continued.

form, as to whether it should be prosecuted further; or whether surveys and further enquiry should be made, and so-forth, and the action then would be taken either directly by the officers of the Government of India, or through the local administration.

3006. But in both cases, after the two great departments, the Financial Department and the Public Works Department, have fully heard and discussed the details of a scheme, all that would be wanted would be the decision of the Governor General, or if it is above a certain sum the sanction of the Secretary of State?—Nothing more.

3007. Has it ever occurred to you whether it might not be desirable that works of a certain dimension should form the subject of a legislative Act, so that there might be some publicity before they were adopted?—I do not think that that idea has ever been started, and considering the constitution of the Governor General's Council, I am not aware that it would be of any great good, presuming that your great desideratum is discussion, so as to invite public opinion upon it.

3008. Is there no publicity connected with the proceedings of the Legislative Council?—No such publicity in the case of individual works, but in the case of projects of an important character involving questions of large or of special interest to the country, the project, with the correspondence on it, is ordinarily published in the "Gazette of India."

3009. Then it never has occurred to you to consider whether publicity before works of certain magnitude are undertaken might not be advantageous in, perhaps, eliciting suggestions which would have prevented certain failures, or would have led to great improvements?—No doubt a discussion of the kind that you allude to would be an essential advantage, but I fail to see that it would be secured by any proceedings in the Legislative Council.

3010. It might be secured, I suppose, if such were the will of the Secretary of State?—It might, no doubt; and so far as local responsibility attaches to the local administration in the construction of a work, or local responsibility may, in reality, involve success or failure affecting the local finances, the discussion of such a question in the way you mention would be an advantage; but there is no body at present in any local administration, excepting possibly Bengal, which has a legislative council, in which the matter could be discussed.

3011. You do not think that in the Legislative Council of the Governor General such a discussion might be of public service?—As the Governor General's Council is constituted I should doubt whether it would be qualified to discuss profitably the merits of engineering schemes.

3012. We, in Parliament, do not discuss very often the merits of engineering schemes, but the fact of their having to come before Parliament gives them a very great publicity, does it not, and is not that supposed to be a considerable advantage?—So far as the provincial responsibility is concerned, I think it would be an advantage if any procedure could be secured in which publicity were given to projects, but I should think also that there would be under the present constitution of the Government a difficulty in securing bodies of the kind required.

3013. All

Mr. *Childers*—continued.

3013. All changes in respect of the revenue in India are more or less carried out under the eye of the public, are they not?—They are carried in that way out in so far as all orders must be made public which alter the course of the revenue and the fiscal administration, but the degree of publicity given before they are enacted or ordered, may or may not be great, as the case may be.

3014. Practically, are not all the changes in the taxation of India known to the public before they acquire the force of law?—It is usual that they should be, but there have been exceptions.

3015. It depends upon the Secretary of State and the Governor General, does it not?—It depends upon the Governor General himself in Council.

3016. If it was the will of the Secretary of State that all considerable public works should be carried out under Acts, and that the discussion of those Acts should be public, that would be done, would it not?—There would be nothing to stand in the way of such a course as you mention.

3017. Do you think that if that were done away public advantage would be gained?—The idea is so novel that I am hardly prepared to express an opinion upon it. In so far as the provincial responsibility is being nominally increased, no doubt there would be an advantage if a public discussion of measures should precede their adoption.

3018. Is it not rather the tendency of the substitution of the provincial for what you call in India an inferior responsibility, to take that responsibility from the shoulders of the one, to the shoulders of the other, without any real opportunity of control?—I think that the tendency has been somewhat of the kind which you mention.

3019. And would not that tendency be met, to a certain extent, if there were a greater publicity in the acts of the inferior body?—I think that some arrangement which should secure the careful deliberation of such projects and designs as you refer to, and not leave them as at present under the purely personal responsibility of a single administrator, would be an advantage.

3020. Taking you now to another branch of the subject, I think you heard, or at any rate you have read, the evidence of General Dickens, in which he dealt not only with public works proper, but to a great extent with the financial aspect of the present policy. General Dickens, I think, spoke of the policy of the Government of India with respect both to railways and to canals as being that a certain sum, more or less fixed over a series of years, should be devoted to those works; do you concur with General Dickens that that is the avowed policy of the Government of India, and that under that, the aim should be to expend something like an even sum over a series of years?—That unquestionably is the right course, otherwise waste is occasioned by the sudden stoppage or the sudden expansion of any works in progress.

3021. And you, therefore, would recommend that, both with respect to railways and with respect to canals, prospective schemes should be worked out and approved by those who are responsible to the Government of India, so that a steady expenditure of the money should go on unaltered over a certain period?—Yes; in the

Mr. *Childers*—continued.

manner of the forecasts which were introduced under Lord Northbrook's government.

3022. Those forecasts have regard both to the probable earnings and to the probable expenditure; I am speaking specially with respect to the expenditure?—It was with reference to the expenditure that I mentioned them with approval.

3023. Speaking from your experience as Finance Minister, do you think that those operations should be disturbed more than is absolutely necessary by considerations of financial prosperity in India?—I think that the forecasts themselves should be laid down with a broad and extended view as to the probable surplus and prosperity of the finances, and I do not think that they should be fitfully or lightly disturbed from any casual fall or rise in that prosperity; but otherwise, I think that the general aspect of the finances should be taken into consideration in determining the amount in future which should be devoted to such works.

3024. Do you attribute much importance to the loans raised for those works being raised rather in India than in England?—If the money is forthcoming at anything like reasonable rates in India, it is unquestionably advisable to have it raised in India.

3025. On what grounds?—I think it is advisable both on political and financial grounds; raising it in India, you raise your money in silver, and in silver obtained in India, you have to repay it; and on political grounds, it is advisable, as far as possible, to induce the natives or the persons who are the inhabitants of the country, to contribute themselves and embark their capital in the works undertaken by the Government.

3026. On financial grounds I suppose you would treat the matter as purely a question of in which way the operation would be most economical?—Yes; but I should be averse to raising loans in England in gold if it were possible to raise them at all upon equal terms in India in silver.

3027. Putting the currency question aside, do you see any advantage in preference being given to loans in India beyond a political advantage?—Not if you exclude the currency question, the exchanges being more and more seriously affected by increased borrowing here, and exclude also the political advantage.

3028. Then you would modify your general impression that it is desirable that the expenditure should be rendered as nearly uniform as possible over a series of years only by the consideration of whether in India the loans could be effected satisfactorily?—By that consideration, and also by the general consideration that I should think it a risk to expend borrowed capital too rapidly, and on too large a scale money on works of a character in which there is some element of risk.

3029. I ask you with regard to works which the Government were satisfied would be remunerative, if they were so satisfied, do you think that on general grounds there is any great objection to their being undertaken in bad times or in good times?—I do not think that the question of bad times and good times, excepting on a large and extended view of the resources of the Government, should be taken into account. But with regard to what you said of the Government being satisfied of their being remunerative, even under

Sir *W. Muir*, K.C.S.I.

4 July 1878.

Mr. *Childers*—continued.

those circumstances, one cannot avoid seeing that there is some risk in the expenditure of vast sums upon works which it is not absolutely certain shall bring in a full remuneration.

3030. You mean that if looking forward to a long period of bad times there were serious doubts as to the remunerative character of a work, you would be less disposed to undertake it than if you were looking forward to a period of good times, but you do not carry it further than that do you?—I would put it in this way, that where works are rapidly increased by a vast expenditure of capital, and where the works involve some degree of risk on account of the profit they would bring normally, and also some degree of risk upon other considerations such as the failure of aqueducts, embankments, dams, &c., or the occurrence of political disturbances, or such like causes, which might paralyse for the time being the productive character of the works, I think that there is a point beyond which it is not advisable to risk too rapidly and to too great an extent vast amounts of capital.

Mr. *Childers*—continued.

3031. What would you call the scale described by General Dickens at which the Government is working at the present time a vast expenditure of capital?—I think it is a moderate and reasonable amount, and has been fixed with great judgment.

3032. You would hesitate, therefore, to diminish expenditure even under the circumstances of one or two bad years?—I should certainly not because of one or two bad years touch it, but if in the future there was a very grave imminence of large disaster financially, I should think that even that expenditure would be liable to reconsideration upon broad grounds; not by fits and starts, precipitately or by intermittent and hurried action, but upon broad grounds it might be the duty of the Government to consider whether even that sum was not injudiciously large.

3033. That would be, would it not, the feeling of every prudent Finance Minister?—I should suppose that such would be the right and proper feeling.

Lieutenant General Sir ARTHUR COTTON, R.E., K.C.S.I.; further Examined.

Lieut. Gen. Sir *A. Cotton*, R.E., K.C.S.I.

Mr. *Onslow*.

3034. YOU have laid great stress in your evidence before us and also in the pamphlet of which I have a copy, and which has been, I believe, circulated to every Member of the Committee, on the fact that every official in India and in England, and the whole of the press is in conspiracy against you; what facts have you which justify you in making that, what I may call, exceedingly strong assertion; have you any documentary evidence to that effect?—No, I have not.

3035. Will you kindly explain to the Committee what is your interpretation of the word "conspiracy"?—I did not say anything about conspiracy.

3036. I am reading now from your pamphlet, "This is the real state of the case; one terrible feature of the time is that the leading journals are in the conspiracy?—The proof of that is very simple and will not admit of any answer.

3037. I wish it to be clearly understood if you could favour me with what is your interpretation of the word "conspiracy"?—A gentleman, a lawyer, who has known India, writes a letter of three columns to instruct the public on engineering, and I, after 50 years' experience, write an answer to it, which the press will not admit. If that is not refusing to hear the truth, I do not know what is.

3038. We will assume so far that it is the truth; at all events what I understand is this, that from the fact of those papers and the Government of India not taking the same view as you do as regards irrigation in India, you look upon it in the light of conspiracy?—No, I beg your pardon; what I look upon as proof is that they will not hear my side of the question; that is the proof.

3039. Then their not hearing your side of the question is a conspiracy?—Yes, I say they have united in this, in trying to bolster up the railways, and on that account they will not hear what I have to say. There can be no mistake about that. I write a long letter to the India Office and I do not even get an acknowledgment of its receipt.

Mr. *Onslow*—continued.

3040. As you bring them in, you wish to include the India Office?—Certainly. Let me give you the history of one thing. One of the Secretaries of State said "If you will write a statement of your views I will undertake that it shall be answered." I wrote the statement, and I heard no more about it. I wrote to the Secretary of State some months afterwards and told him that I heard that the answer to my paper had been circulated in India officially, and begged for a copy of it; and he sent me a copy of it; upon which I wrote an answer to every paragraph of it, and not the slightest notice was taken of it.

3041. You said in this pamphlet that if your system of irrigation were put into execution, "the vile opium trade, and the cruel salt tax, might both be given up, and the whole finance settled on a thoroughly healthy foundation;" of course it is not the province of this Committee to say whether the opium trade is vile, or whether the salt tax is cruel, but I should be glad to know what is your estimate now of the net yield of those two taxes?—I do not know exactly about opium, because it is so obscure in the way it is reported. The salt tax, I believe, is about six millions, and I think the net return of the opium is under six millions; but I cannot make out exactly what it is.

3042. It has been over six millions; we will put the two together, and we will say over 12 millions; you think that by spending this money, of which you told us the other day, 240,000,000 *l.* in 20 years, the opium tax and the salt tax could both be remitted?—They could be done away with with perfect ease, if the country was so improved.

3043. Improved to what extent; to the extent of spending all that money which you recommended the other day, or only a portion of it?—I would not say that. I do not consider that the whole of that is necessary to improve the country to that extent.

3044. I should be glad to know what you do think ought to be spent?—I need not go beyond what I said the other day about it, 240,000,000 *l.*

3045. How

Mr. *Onslow*—continued.

3045. How much of that 240,000,000 *l.* need be spent to do away with the opium tariff, and the salt tax?—I could not say; about one-half, perhaps.

3046. That is to say, by spending 120,000,000 *l.* you could do away with 12,000,000 *l.* of taxation?—Yes, if you like to put it so. If you will allow me to state it in my own way, I will state it; 120,000,000 *l.* expended in this way would irrigate 40,000,000 acres of land. The average increase of produce due to that would certainly not be less than 1 *l.* 10 *s.* an acre. Then to that would be added the saving in transit.

3047. How much is that?—You may put down, if you please, another 10 *s.*, but there is no possibility of estimating it.

3048. I do not quite understand, if there is no possibility of estimating it, or if it was only a conjecture, how you could say that you could do away with the opium tariff and the salt tax?—I say that 10 *s.* might be saved in transit. It would be a great deal more than that, but nobody can say what it will be when the traffic of the country has increased. Just let me put it in my own way. How can I say what the increase will be when on the main line of the Godavery the traffic has increased twentyfold; and how can I say what the saving would be when the whole country is supplied with canals.

3049. Excuse me, this is part of a scheme which you have told the honourable Member for Pontefract you have considered, and I am presuming that you have considered every portion of this scheme?—But I say it is impossible for anybody to estimate the extent to which there would be a saving if the whole country was open to cheap transit; I allow 10 *s.* an acre, but I am quite sure it would be a great deal more than that.

3050. Then you would put it at 10 *l.* as the average increase of produce per acre?—Yes, that would be so, with a great variety of other benefits.

3051. Then that would bring in a saving of what?—Of 80,000,000 *l.* a year.

3052. Then I understand you to say from those figures which you have now laid before us, that by the time that 120,000,000 *l.* have been spent on irrigation works there will be a saving of 80,000,000 *l.* to the revenue of India?—Yes, not to the revenue, but 80,000,000 *l.* of total return.

3053. Would that be the gross?—Yes, gross benefit to the country; only at the same time I have stated the increase of produce and the saving in transit.

3054. Eighty million pounds a year benefit to India by 120,000,000 ., according to the estimate which you gave the honourable Member for Pontefract the other day, which would be spent in 10 years?—Yes, which could safely be spent in 10 years.

3055. That is to say that in 10 years it would benefit the country to the extent of 80,000,000 *l.*?—That is exactly what I say; you may safely say that there would be a saving of 80,000,000 *l.* Mr. Leslie estimates that the saving to the country on the first 130 miles out of Calcutta, would be 2,000,000 *l.* a year in transit alone on one line of 130 miles; that would give you some idea, not of what my opinion is, but of what the opinion of a railway man is on the saving to the country by affording cheap transit.

Mr. *Onslow*—continued.

3056. When the other 120,000,000 *l.* have been spent, in another 10 years you would get another 80,000,000 *l.*?—Yes.

3057. That is to say, 160,000,000 *l.* of direct profit to the people of India in 20 years?—Yes, of direct profit to the country; I have not the smallest doubt of it.

3058. And that 240,000,000 *l.* is to irrigate what?—Eighty millions of acres.

3059. After that 240,000,000 *l.* have been spent, in another 20 years you would proceed in the same way, would you?—I do not know what I would do then; that is all forced upon me; I only say what we ought to do at present; I do not pretend to go on looking forward for 20 years.

3060. I think, in your evidence you said you recommended this to go on after 20 years; I think you said for 100 years; when that 240,000,000 *l.* was spent how much of the area of India would have been irrigated?—Eighty million acres.

3061. That is about one-third of the total irrigable land in all India?—I cannot say as to the amount of irrigable land, but this would be one-twelfth of the whole country of India.

3062. You propose that there should be some expenditure after this money is spent, as that would only irrigate one-twelfth?—I will not give an answer about anything beyond 20 years. We have irrigated in Godavery 700,000 acres, and we reckon the average increase of the produce there at 2 *l.* an acre; I have no doubt of it whatever; that is nearly a million and a half of increase of produce in one district where we have not completed the work. That is an actual case, and I have no doubt that it can be distinctly ascertained. Besides that, there is a saving in transit and other things, and certainly that district has been enriched 2,000,000 *l.* a year, and that is one district out of 160.

3063. Is this 2 *l.* an acre the profit after a careful consideration of everything, or is it a mere conjecture?—It is the increase of produce; we have looked into it over and over again hundreds of times, as to what the ordinary produce of the land before was and what the average produce is now.

3064. Then that large scheme which you would like to see carried out is uniting the Ravee, the Sirhind, the Ganges, the Lower Ganges, the Soane, the Orissa, the Godavery, the Kistna, the Toombuddra, and other canals?—Yes.

3065. If you were to unite all these canals, have you made a calculation of the number of acres that would be irrigated thereby?—I was speaking there about navigation, not irrigation.

3066. But they would be irrigating as well, would they not?—Some of them would be connected with irrigation, and some would not.

3067. Can you tell the Committee how many miles of irrigation you would get by the system?—This main line from Kurrachee to Calcutta, and from Calcutta to Cape Comorin, and from Cape Comorin to Carwar. Then across India, from Surat to Cocanada, and from Carwar to Madras, and from Poonani to Madras; altogether, about 6,000 miles.

3068. Have you made a calculation of the cost of that scheme?—Yes, I have made a rough calculation.

3069. Could you tell the Committee what is

Lieut. Gen. Sir *A. Cotton*, R.E., K.C.S.I.

4 July 1878.

Mr. *Onslow*—continued.

that rough calculation?—Out of that 6,000 miles I cannot say exactly at this moment, but about 1,000 miles is actually done; so that it would leave 5,000 miles. The average of that, as you see, would be 3,000 *l.* a mile.

3070. Do you think that a scheme for navigation canals could be carried out for 15,000,000 *l.*?—Yes. On that point I have not the slightest doubt in my own mind whatever that it is the very best thing to be done for India, and that more results could be obtained from it than from anything else which could possibly be done in the way of expenditure.

3071. Have you ever thought how many aqueducts would be required if this scheme were carried out?—I have taken a general view of it all, and I have roughly estimated all the lines.

3072. Including the price of the aqueducts?—Yes, everything; allow me to mention, as you are speaking of aqueducts, that we carried an aqueduct of 30 feet broad, to carry water five feet deep over a branch of the Godavery 800 yards broad, at a cost of 30,000 *l.*

3073. On the whole of that mileage would you propose to carry goods by steamboat?—I would make them capable of carrying by steamboat, but I confidently expect that by far the greatest proportion of the traffic would always go by human labour.

3074. Would not there be some difficulty in steamboats plying on those canals, which would have naturally to go out and in a very great many times to avoid collision with the canal boats, and therefore you must make those canals somewhat wider than the present canals are made?—Of course we should not make the canals the width that we are making them now, but I think that where it is solely for navigation, about 40 yards would probably be sufficient for such traffic as we are likely to have in India; but many of the present canals are much wider than that.

3075. For that width you think you could make a canal in India for 3,000 *l.* a mile?—Yes, on an average, 3,000 *l.* a mile, and I will give you an instance of that. The main Soane Canal has cost 4,000 *l.* a mile, and it is 70 yards broad.

3076. That is in the neighbourhood of a river; but supposing you were to go some distance away from a river, the very fact of distance would enhance the price of the canal?—Yes, according to the nature of the face of the country.

3077. The further you are away from the water, of course the more it would cost making the canal and keeping the water in the canal?—The question is really the nature of the country through which the canal is carried, there is no difficulty about the water.

3078. Do you think by that scheme which you have laid down, it would be feasible to get water all the year round for navigation?—Certainly, there is not the slightest difficulty about it.

3079. For steamers of 250 tons?—Yes.

3080. And carrying a draft of water of four feet?—Yes, six feet.

3081. Then the depth of the canal would have to be, of course, more than six feet?—Eight or nine feet. We are making canals generally now nine feet.

3082. You told the honourable Member for Pontefract the other day that you had never considered the means of raising this large sum of money which you propose; having some knowledge of India, do you think it possible that the country could bear the enormous strain of borrowing 10,000,000 *l.* a year for 20 years?—I must again repeat what I have said so many times that that is not my business. I am not a financier. I propose a great scheme, and if the financiers say, We cannot carry it out because we cannot raise the money, that is their matter, it is not mine; but I am perfectly certain that there is not the slightest difficulty about it.

Mr *Onslow*—continued.

3083. Surely you, as an engineer, talking about the feasibility of a scheme, ought to look on all sides of the question?—No, an engineer's business is to look to the engineering points of the question, and the financier's is to look to the financial part of it.

3084. Then you do not look upon it at all, as far as you are concerned, in the light of a statesman, but merely as an engineer?—Entirely as an engineer. I have my opinion, of course, respecting it, but I look upon it entirely in my own professional line. If the financier says, I approve or disapprove of your scheme, but there is one thing about it, I cannot raise the money; I have nothing more to say.

3085. Is it your opinion that if this money was spent, 10,000,000 *l.* a year, the price of wages would remain stationary?—Yes, that is one point which I have considered. When we began the Godavery works, it was a very serious point how far it was advisable to push them on for fear of totally deranging the whole state of things in the district, but I am persuaded that you could expend at the rate of 10,000,000 *l.* a year over all the districts of India, 60,000 *l.* per district per annum, without at all deranging the price of labour.

3086. Are you aware of the price of labour being deranged anywhere on account of a sum of money which has been spent at present in irrigation?—No, I am not aware; it certainly was not so in Godavery.

Mr. *Fawcett.*

3087. You have frequently said, in contrasting railways with irrigation works, that railways do not pay in India; you are probably aware that evidence has been given by many persons who hold official positions, which tends to show that railways pay very much better than irrigation works; will you therefore lay before the Committtee any figures which substantiate your statement that railways at the present time do not, on the whole, pay in India?—I have given the figures in my former evidence; I could not say more about it.

3088. How did you prove it?—I added to the actual expenditure on the railways, which is now about 113,000,000 *l.*, the cost of land, which so far as I can make out from the Blue Books may be about 8,000,000 *l.*, making 121,000,000 *l.*, and also the accumulations of interest upon that since the work was begun, making altogether 170,000,000 *l.*

Mr. *Edward Stanhope.*

3089. Originally I observe you put the cost of the land at 12,000,000 *l.*?—That was a mistake, it should be 8,000,000 *l.* I meant one-twelfth of the cost of the works.

3090. How do you arrive at the 8,000,000 *l.*?—In a former Blue Book it was stated that the

cost

Mr. *Edward Stanhope*—continued.

cost of land was one-twelfth of the cost of the works; that was for many years previous, and I have taken that as the proportion.

3091. Would not that be putting the land taken for railways at an enormous rate per acre?—I do not know at all; I only saw it stated so.

3092. Then as to your next item, the debt, which you put at 50,000,0000 *l.*, have you not noticed in the latest official returns it really is something like 26,000,000 *l.* ?—Yes, without any accumulation; simply the interest; it is the actual sum that you have paid.

3093. Do you mean that it has risen since 1869 from 21,000,000 *l.* to 50,000,000 *l.* ?—Yes; the interest of that 21,000,000 *l.* alone is 1,000,000 *l.* a year, and that has been paid now for eight years since that.

3094. Taking it nett, the whole will make, say 29,000,000 *l.* ?—That is the difference of the interest paid to the shareholders.

3095. But you are aware that of late years the sum which the Government has had to pay in that respect has been very much reduced indeed?—Yes, just last year and the year before; it was 1½ million the year before last; it is only just lately that it has been so much reduced.

Mr. *Fawcett.*

3096. In reckoning your figures you make out that the expenditure on capital has been 120,000,000 *l.*; 8,000,000 *l.* for land, and 50,000,000 *l.* for interest?—Yes.

3097. And what do you say is the return on that expenditure?—The return last year I have not got; the year before that, in the last Blue Book that was published, it was just 4,500,000 *l.* nett return.

3098. Therefore, according to your contention, they did not pay more than about 2½ per cent.?—I forget exactly; it is somewhere about 2½ or 2¾ up to the last Blue Book. They have been more profitable this last year, but then a very large proportion of the money was paid out of the Treasury.

3099. What you contend for is, that the apparent increase of the prosperity of railways last year was simply a transfer of account, that is to say, it was paying money out of one pocket to put it into the other?—A good deal of it; it was paying 2,000,000 *l.* out of one pocket and putting a quarter of a million into the other.

3100. According to your figures, the railways pay about 2½ per cent. on the whole; how do you prove that irrigation works, as a whole, pay better?—I take the whole accounts put down in the Blue Books of capital expended and the nett receipt.

3101. What do you make it out to be?—I put it all down in figures before; I do not remember at the moment.

3102. In making your calculation that you have given, do you include all the same things which you do in calculating the return on railways, and then reckon the interest on construction, at compound interest?—Yes; but I reckon also the profits and compound interest on the profits also. If we are to charge the Ganges Canal with its debt, we ought to charge the Godavery Works with their accumulated profits.

3103. You have advocated the construction of a canal from Kurrachee to Calcutta. Could you tell, within 50 per cent., or have you considered it sufficiently to say what that canal would cost?—We have got excellent data for it; 800 miles have been cut already, which gives us excellent data for all the rest.

Mr. *Fawcett*—continued.

3104. Are you certain that that 800 miles represents a fair average of the remainder?—No; but I say that you can calulate from that, as there are no extraordinary difficulties in the parts that remain to be done.

3105. You reckon, do you not, the 800 miles to have cost at the rate of 3,000 *l.* a mile?—I think that the whole distance is rather more than 2,000 miles, and I think about 800 are done; that would leave 1,200 miles, which, I think, might be done for 3,000 *l.* a mile.

3106. But do I understand you that, of the 2,000 miles of this canal from Kurrachee to Calcutta, 800 miles have been, at the present time, constructed 40 yards wide and 8 or 9 feet deep, and supplying other requisites which you think are essential for canal navigation by steam?—Yes; they are not finished, a great deal is done, but some of it is in execution.

3107. And when that is done, can you produce any figures to show that of the portion of this 800 miles that has been completed, 3,000 *l.* a mile represents its cost?—No, it has cost less than that.

3108. Can you produce the figures?—I can easily make out a statement for the Ganges Canal accounts, and so on, showing that they do not average 3,000 *l.* a mile up to this time.

3109. Would the Ganges Canal supply the requisites that you could proceed upon?—The Ganges Canal locks are only 150 feet long, and would not admit steamers of 250 tons. It is only the Sine and other later locks that are made 150 feet long.

3110. You have not the figures here, to show that?—No.

3111. But considering the interest on the money expended in altering the Ganges Canal, can you state that it was constructed at 3,000 *l.* a mile?—I can just give you this rough statement, that the Ganges Canal has cost, up to this time, 2,800,000 *l.*, the two main lines of navigation are 700 miles, so that at that rate the whole has only cost 4,000 *l.* a mile. Supposing all the distribution and everything was charged to those lines, it has only cost 4,000 *l.* a mile. The actual main lines have not cost 2,000 *l.* a mile.

Mr. *Edward Stanhope*

3112. What is the date of this letter of Mr. Leslie's, that you put in?—I think it was about December 1866.

3113. Has your attention been called to a report which was made on the traffic to Goalunda by Captain Clarke, deputy consulting engineer to the Government of India?—No, I have not seen it; I heard that such report had been made quite lately.

3114. In that report he apparently makes out that 34 per cent. of the produce through Goalundo is carried by railway, and he further adds, a passage which I will read to you: "The route by the railway steamer and railway is preferred by every shipper at Naraingunge and Dacca to any other route. The goods undergo less risk, and reach Calcutta much sooner. If the flotilla of the railway company were equal to the traffic, all

Lieut. Gen. Sir *A. Cotton*, R.E., K.C.S.I.

4 July 1878.

Mr. *Edward Stanhope*—continued.

that now goes by country boat would be taken by the railway;" do you agree in that opinion?—No, I entirely agree with Mr. Leslie, that nothing could stand in competition with the canal.

Mr. *Childers.*

3115. You have studied this navigation and canal question now for 30 or 40 years?—For 60 years nearly.

3116. You have studied the question with the Public Works in connection with it for 30 or 40 years; have you had during that time opportunities of studying the same question in other countries besides India?—I have a knowledge of almost all that has been going on in all countries more or less, and I have got two volumes here about what has been done in the United States; I was going to offer them to any honourable Member who wished to see them; there is an immense deal of information upon the subject in them.

3117. Do you consider that the views which you have expressed about India would apply to other countries?—More or less, of course to other countries, but they are specially intended for India, because one of my main points is the extraordinary nature of the face of the country, which admits of a system of perfect lines of navigation, which is quite a peculiarity of India.

3118. But not limited to India, I suppose?—There is nothing like it in the United States for instance, nor in Europe, nor anywhere that I know of.

Mr. *Ashbury.*

3119. In connection with the expenditure on Public Works, are you in favour of supervision by European officers or natives?—By Europeans entirely; the main superintendence should be entirely by Europeans.

3120. Both as regards railways and canals, or Public Works in general?—Yes, everything.

Mr. *Edward Stanhope.*

3121. I understand you wish to add something to your previous evidence?—Yes, perhaps I may be permitted to offer these additional remarks: An honourable Member asked me about steamboat canals in the States. As I have already stated, I have brought two volumes of reports by the Transportation Committee there, in case he should wish to look into them. I have marked at page 442, volume 2, the account of one of the steamboat coast canals. This account also bears upon the questions the same Member put to me about the comparison of inland coast navigation with seacoast transit. This line of canals completes the inland communication from North Carolina to Long Island Sound, 400 miles. The locks are 220 feet by 40, and admit boats drawing 12 feet, but the canals are not completed to that depth. The traffic through the canal was 300,000 tons a year, the charge is one farthing a ton a mile. Many questions were also put to me about the state of Orissa and its trade. I have since received a return of the irrigation and traffic there for the last three years, which may be of use to the Committee. Irrigation under the Midnapore Canal, 1876-7, 32,000 acres; 1877-8, 20,000 acres; water rate 1½ rupee; Midnapore and Tidal Canal together, tolls 1876-7, 11,000 *l.*; 1877-8, 17,000 *l.*; receipts

Mr. *Edward Stanhope*—continued.

on Midnapore Canal alone last year, 11,000 *l.*, or 220 *l.* a mile, the interest at 5 per cent. on a capital of 4,000 *l.* a mile, so that that line already pays interest for an expensive canal. The Hidgely Canal has paid 220 *l.* a mile last year, while its cost was 6,000 *l.*, so that it nearly pays its interest, and the traffic increases rapidly, though it ends at nothing. If it were completed to the tide water of the Mahanuddy, it would pay its interest two or three times, even with its present excessive tolls; the increase last year on the canals was 50 per cent. The Orissa irrigated area was in 1876-7, 29,000 acres, and in 1877-8, 90,000. The receipts here were 7,000 *l.* and 16,000 *l.*; and they are expecting an increase this year, so that there is great reason to hope that the difficulties are in a good measure got over there in spite of the want of communication with Calcutta. If the canal were open to Calcutta, a prodigious stimulus would be given to the Delta; as it is, a very great improvement in the district is reported. The sea trade in 1874-5 was 150,000 *l.*, in 1875-6, 670,000 *l.*, and in 1876-7, 1,240,000 *l.*, eightfold in two years; and this is besides the increased export inland. It is also reported that the whole of the land protected by the works has increased in value, so that we may be assured that this unfortunate district is really now rising out of its depressed state. And I am quite certain, if the Government would only carry out the works according to the original scheme, and improve the navigation of the Upper Mahanuddy, we should see some such a revolution in the whole basin of the Mahanuddy as we have seen in the case of Godavery. Think of the wheat on the Upper Mahanuddy selling last year at 6 *d.* a bushel; I have no doubt that the increase of crop by irrigation there is 1 *l.* an acre for grain only, which would be 90,000 *l.*, besides the saving of transit, that from the embanking of the rivers, the drainage, &c., so that the total benefit must be at least 120,000 *l.* a year, or 8 per cent. on the cost of works. If the works are completed to the extent of 3,000,000 *l.*, watering a million acres, the increase in grain alone will certainly be a million, and the whole benefit, at least 1½ millions, or 50 per cent., from which, if the authorities cannot collect 8 per cent. to repay the Treasury, it will be very odd. But, of course, in these matters, as in everything else, all depends upon a work being carried out. I have also returns of the Soane works. In 1876-7, the acreage was 55,000 acres, and in 1877-8, 290,000 acres, of which 64,000 paid nothing for water. The rates were 1 rupee and 2½ rupees; the total receipts I make out were about 37,000 *l.*, or 7 per cent., on a capital of 500,000 *l.*, one-fourth of the total expenditure up to this time, which is quite satisfactory, as certainly not a quarter of the works are yet in operation. And with respect to the total effects I think we are safe in estimating the increase of produce at 1 *l.* an acre, or 450,000 *l.* in all, besides the other benefits, so that the returns to the country are probably already 30 per cent. on the whole expenditure of 2,000,000 *l.* I must beg again and again to refer to this total return to the country. In the inquiry as to the results of irrigation in Bombay, and again in the questions on a general plan of extended irrigation and navigation for all India not a word was said about this, but the whole subject was dealt with as if the only question

Mr. *Edward Stanhope*—continued.

tion was the money returns to the Treasury. I am also informed that an expenditure of 15,000 *l.* has already been put in hand for the connection of the tidal creeks in Orissa, and arrangements are making for regular steamboat passenger transit on the canals there; it is also stated, that the canal will be completed to Calcutta within four years. I do trust from these statements, that now, at last, a real and effective prosecution of these essential works has been resumed, and that we shall no longer see money wasted in beginning works and leaving them unfinished, and then pointing to them as failures. I beg also to refer to what I said about the traffic on the Hidgely Canal; I gave it as 150,000 tons. I see the last year's receipts are 220 *l.* a mile, which, at the nominal toll of a farthing would give 220,000 tons as the average, but from another paper I find that, from the false way in which the tolls are levied, the actual toll greatly exceeds the nominal toll, so that probably the traffic does not exceed 100,000 tons. I would also offer some remarks upon the questions that were put about the quantity of water required to make the Godavery navigable throughout the year. This necessarily appears a very difficult question to persons not conversant with such things, but in reality it is perfectly simple. At one of the shallowest places in the river I measure the quantity flowing in the channel when the river is at the lowest, perhaps one foot deep, and again at the same place when it is three feet deep; the difference is, of course, the quantity required at the end of the dry season. Suppose the river falls below three feet on the 1st of January, and begins to rise again on the 1st of June, then we have to throw in an additional quantity of water from nothing, to suppose 400,000 cubic yards an hour, or 10 millions a day at the end, making the total quantity about 1,000 million cubic yards. Now, we can easily calculate from Colonel Fife's tanks in Bombay, and other data, what it will cost to store 1,000 million cubic yards; but, I must add, whatever quantity we store, we shall have the benefit of it, whether we store the whole or not. We can make use of what we have, either to keep the water during the whole season at a less depth, or we can keep

Mr. *Edward Stanhope*—continued.

Lieut. Gen. Sir *A. Cotton*, R.E., K.C.S.I.

4 July 1878.

up the full depth at a portion of the five months. The case is one of the simplest calculation. Further, the question, No. 2629, was, "Your answer is, that the increase of land revenue in Tanjore was more than 50 per cent.?" On referring to the Administration Report, I find that the Irrigated Land Revenue for 1875-6 was 370,000 *l.*, and that for 1830 was 230,000 *l.*, an increase of 140,000 *l.*, or 60 per cent.; I could not answer the question at the time. On Question 2725, as to the unsatisfactory state of the land left unirrigated, though it is not properly within my duties, I may state that I have a very strong opinion, as I have always paid a good deal of attention to the subject of agriculture in India. It is that there is literally a perfectly unlimited opening for the improvement of India in respect of its agriculture. I think the appointment of a first-rate English agriculturalist to the Famine Commission in India the most hopeful step that has yet been taken. The results that have already been obtained on many of the model farms I consider quite conclusive as to the complete revolution that may be effected by improved agriculture. The present average produce of India is quite contemptible; both European landowners and superintendents of Government farms have produced crops five or 10 times the average of the ordinary cultivation of India; the principal cause of the low produce is the want of capital, in the hands of the ryots; but they also want Europeans in this as in everything else to put them in the way of a more effectual system; I would make the agricultural departments one of the grand departments of the Government, and have a model farm, at least, in every district of India, that is, 160 farms; we do not realise what it is to introduce an improvement among 240 millions of people. If 99 farms effected nothing, and the hundredth introduced one general improvement, it might pay for the cost of the 99 ten times over. I trust I may be excused making these remarks, on the ground that it is impossible that a man could live among the ryots of India for 50 years without his attention being greatly drawn to this subject.

Thursday, 11*th July* 1878.

MEMBERS PRESENT:

Mr. Agnew.
Mr. Ashbury.
Sir George Campbell.
Mr. Childers.
Mr. John Cross.
Mr. Grant Duff.
Mr. Fawcett.
Lord George Hamilton.
Mr. Hardcastle.
Mr. Sampson Lloyd.
Sir Joseph M'Kenna.
Mr. Ernest Noel.
Mr. Onslow.
Mr. Pease.
Mr. Edward Stanhope.

LORD GEORGE HAMILTON, IN THE CHAIR.

The Right Hon. Lord NAPIER AND ETTRICK, attending by permission of the House of Peers; Examined.

Right Hon. Lord *Napier and Ettrick.*

11 July 1878.

Chairman.

3122. YOUR Lordship was Governor of Madras for five years, were you not?—I held the position of Governor of Madras for rather more than six years.

3123. And during that period I believe you acted for a certain time as Viceroy?—I acted as Viceroy for upwards of two months after the lamented death of Lord Mayo.

3124. A considerable amount of evidence has already been laid before the Committee as to the general results of irrigation throughout India; but we were anxious to obtain some specific information as regards the Presidency of Madras; would your Lordship be kind enough to inform the Committee if you think that irrigation works in the Presidency of Madras should still be undertaken upon a considerable scale?—Before answering the specific question which your Lordship has addressed to me, I hope I may be forgiven if I offer a short explanation to the Committee. I wish to say that I have had no professional information upon the subject of public works, and I am afraid I must add that I have had very little accurate statistical information at any time available at a moment's notice. Six years have now elapsed since I left the Presidency of Madras, and my special knowledge, such as it was, has already begun to fade from my memory. Should the Committee do me the honour to examine me at any length, all I can venture to offer to them are impressions or opinions, not data or facts. With this apology for the imperfection of the information which I may be able to submit, I shall now answer the specific question: I think that irrigation works on an extensive scale can still be undertaken in the Presidency of Madras.

3125. Is your Lordship of opinion that the area of wet cultivation in that Presidency might be considerably expanded?—I think the area of wet cultivation might be considerably expanded.

3126. If works were undertaken with that object I assume that the mitigation or the prevention of famine would, to a certain extent, be accomplished?—Should the area of wet cultivation of a trustworthy kind be expanded the area of famine will be proportionately limited; that is

Chairman—continued.

the first advantage. Secondly, a greater demand for labour and for produce of various kinds will be created in the country. Thirdly, the general wealth would be increased, and therefore the reserves in the hands of the people against famine would be increased; but I am not prepared to say that scarcities in the dryer parts of the country would be very materially limited.

3127. We have had it in evidence that there are not a large number of rivers in Madras whose supply of water is independent of the local rainfall; I assume that in advocating the extension of irrigation works you would wish those works to be supplied from rivers whose sources were, as far as possible, permanent?—I think that the Government would do well to be extremely cautious in spending money upon the repair or enlargement of tank works which cannot be connected with permanent sources of water supply. I think also that the Government would do very wrong to increase the number of local tanks, which depend entirely upon local rain for their supply. The multiplication of small tanks depending upon mere local rainfall might be, as it were, the multiplication of famine traps or the causes of little centres of population which would become more liable to famine in consequence of the occasional presence of water.

3128. They would increase the population during a year of ordinary rainfall, and when the rainfall diminished or failed altogether there would be a larger population to supply with food?—That is so in cases in which the reservoir is entirely dependent upon local supply in a locality in which rain is of a very precarious character.

3129. If works connected with rivers whose supply of water is permanent, were constructed to a considerable extent in Madras, do you think that there would be a great increase in the population?—I think that wherever there is a development of wet cultivation, especially in the delta form, there would be a large increase of population.

3130. But would the supply of food increase more than sufficiently to meet the wants of the increased population?—My impression is that the increase

Chairman—continued.

increase of the food supply would far exceed the increase of the population, and that a very large surplus would probably remain for exportation to the interior or to foreign countries. The existing deltas swarm with people, and yet even in the delta of the Cauvery, which has had a large measure of wet cultivation during the whole historical era, the food supply is much larger than the local consumption. I have also observed that notwithstanding the extreme density of the population in the delta districts the wages of labour in the irrigated delta districts are, on the whole, higher than they are in the dry districts.

3131. The conditions under which irrigation was carried out in the delta districts are somewhat exceptional. There would be greater difficulties in constructing works of a similar nature in other parts of Madras, would there not?—The three great deltas of the Cauvery, the Kistna and the Godavery, are the most favourable examples imaginable of delta irrigation; there are, however, other smaller deltas belonging to the minor rivers which are more or less under the same conditions, and there are also tracts of ground along the margins of the river on the lower part of their course, which have a great deal that is analogous to the conditions of delta irrigation.

3132. Then you would advocate the extension of irrigation in Madras, wherever it is practicable to get a permanent supply of water?—If I may be allowed to answer that question in my own way, I would say that the first class of irrigation works which ought to be attended to and completed, are those which are generally termed the great delta works; that is to say, the works in the deltas of the Cauvery, the Godavery, and the Kistna. It would be inexcusable to neglect the complete development of those works which are incontestably very profitable and very beneficial. Next to that class of works, the class of works which I would advocate would be the accomplishment or completion of the works on the smaller deltas, such as the deltas of the Pennair, Vellaur, and Tambrapoorne Rivers, and the marginal districts along the lower course of those rivers, which have a great deal in common with the deltas. The third class of works which should be attended to, are the local tanks of the country, and the minor irrigation works, some of which, however, are of considerable importance; the repair and development of those tank works, which have a connection with permanent or tolerably trustworthy water sources. The fourth class of works is also one of a very interesting, but up to the present time, of a speculative character. I mean the creation of great interior works of a mixed character, deriving their source from the great permanent rivers of the country, works involving very large channel works, masonry works, reservoirs, locks, and engineering works of the most formidable character. These works, however, up to the present time are of a speculative character, and should not be rashly undertaken without a most careful inquiry, survey, and estimate.

3133. You have spoken of works of a mixed character; by that I assume you mean canals in which it is supposed to combine irrigation and navigation?—My meaning, when I used the words "mixed character" was that those works would be of a very complex character; they would imply large weirs upon large rivers, and

Chairman—continued.

long watercourses drawn from those headworks, watercourses sometimes involving works of deep excavation, often involving masonry works, often involving the construction or enlargement of vast tanks, and the construction of locks, and all the provisions necessary for combined navigation and irrigation. An example of such works, though perhaps not of the most difficult character, is the Kurnaul Canal, of the Madras Irrigation Company.

3134. That company has not proved a success, I believe?—No, it has not proved a financial success.

3135. Then it is quite clear that for the construction of works, such as your Lordship has indicated, which would be of a very peculiar and costly character, we must not accept the cost of the construction of works of a different nature in the delta, as safe data upon which to estimate the construction of such works as your Lordship has alluded to?—You cannot accept the scale of cost in the deltas as any guide whatever to the cost of the complex works which I allude to; but you cannot even accept the scale of cost in the three great deltas as a safe guide to the cost of works in the smaller deltas, or on the margin of the rivers to which I have alluded.

3136. The reference which was made by the House of Commons to this Committee was that we should inquire into this question from two points of view; first, as regards the financial results; and secondly, as regards the prevention of famine. Have you ever at all estimated or calculated sort of per-centage might be expected upon the outlay on works of the different classes which you have mentioned?—I think that with reference to two of the classes which I have mentioned, some trustworthy impression may be recorded. With reference to the development of the present delta works, I do not at present see why the future development should not be as profitable as the works have been up to the present time, or nearly so. Labour is certainly dearer now than it has been; but the difference in the mere cost of labour should not be so great as to create a very much greater expenditure; and no doubt the experience which has been gained in the delta works ought to make future work in the deltas easier and cheaper. I think, therefore, that if the works of the Godavery incontestably pay upwards of 20 per cent. upon the capital outlay, there is no reason why future expenditure should not be as remunerative as the past. The same may be said of the Kistna, which has paid about 15 per cent., and the same may be said of the Cauvery, although the per-centage realised on the Cauvery works from our outlay is very difficult to calculate.

3137. On account of our outlay being spent in additions to an old native work?—There was so very large and complex a basis of native work in the Cauvery, that I do not know whether the English share has ever been accurately disentangled from the Native share; but there can be no doubt that the outlay of the English Government upon the Cauvery works has also been immensely profitable.

3138. At present only a limited sum is annually expended by the Indian Government in prosecuting irrigation works in Madras; if your Lordship's suggestions were acted on a far larger outlay would be necessary; you would, I assume, propose that that outlay should be supplied by

Right Hon. Lord *Napier and Ettrick.*

11 July 1878.

Chairman—continued.

borrowed money?—The outlay upon the great delta works should unquestionably be undertaken with the greatest confidence, and without the least delay, from borrowed capital. With reference to the development of irrigation works on the smaller deltas in connection with the small rivers of the country, I think that there are some cases in which the outlay should be made from borrowed capital; in those cases a resolution to that effect could only be taken after a most careful inquiry into each particular scheme. With regard to the repair and development of the old tank works of the country, sometimes that might be undertaken from borrowed capital, but more generally from the current revenue. With reference to the great and complex works in the interior, of which I have spoken, up to the present time all is mystery. I have in my memory examples of all the classes of productive works to which I have alluded, and I cannot say that I am aware of any one of the complex interior works to which I have referred, which I could at this moment affirm with confidence should be undertaken from borrowed capital, although there are one or two that I hope might be so undertaken.

3139. Could you mention what the name of the work is?—When I was in Madras, the Madras Government had two such complex works under consideration, and great hopes were entertained of both. One was for the employment of irrigation on the Ganjam river, a work which it was intended should include on a moderate scale almost every element of an Indian irrigation work. It was proposed to include storage reservoirs on the head waters of the river, long channels, tanks, and distribution works, all on a moderate scale, but forming on the whole a complete system of irrigation; the river being used as a unit of irrigation from beginning to end. The inquiries, surveys, and estimates respecting that work of moderate dimensions, extended over four or five years; and the result was that the Government of Madras, as I understand, to their disappointment, were not able to satisfy the Government of India that this little representative scheme would realise more than 4 per cent., consequently the Government of India judged that it was impossible that it should be undertaken from borrowed money. There was a much greater and more interesting work; a work, I may say, of romantic interest, in the South of India, which I fear might fatigue the Committee by describing, but which, I believe, has also proved a failure, and which cannot be undertaken from borrowed capital.

3140. Would you describe what the last work that you allude to is, and which you say proved a failure?—I mean that the Government of Madras failed to show to the Government of India that it would pay a remunerative return, and it has never been sanctioned.

3141. Could you shortly indicate what the work is?—It is rather difficult to indicate the nature of an irrigation work very shortly, but I will do what I can. The irrigation work to which I allude was one of a very peculiar character; there is a wild mountain river in the Travancore territory, called the Perryaur, which empties its water upon the western coast; near the head-water of this river there was a point at which it was believed that the river might be turned through or over the water-shed, and, as it were, hurled into the eastern plains; so that it would irrigate a large area of the province of Madura and find its way into the Eastern Sea. The diversion of this river from a western to an eastern course formed the basis of a projected irrigation work; the head works in the Travancore territory were of very large and very difficult character, and involved great expense. I have learnt since I left the country that it is not expected that the scheme would prove as profitable as we hoped, and that it has been suspended if not laid aside; the inquiries belonging to that project extended also over a period of five or six years, and consumed the energies and, I am afraid, injured the health of some of the ablest engineering officers in the Presidency; that is the second example of a complete irrigation work of which great hopes were formed, and which, I fear, cannot be executed from loan capital alone.

3142. Then there are certain classes of works which you think might with safety be undertaken and constructed out of borrowed funds, and there are others the return from which are so uncertain that you would not advocate their construction from loans; those works, I assume, you would wish to be provided for out of the ordinary revenue if it were possible to do so?—It remains for the Government to determine on a general view of policy whether works of that nature may be executed in some exceptional instances from loan capital, although they may not promise a direct return equal to the interest of the money borrowed, plus an amount which would extinguish in time the capital of the debt. In my time in India it was generally understood that the Government of India would not sanction the execution of an irrigation work from loan capital unless the local Government could show that the return would be equal to 6 or 7 per cent.; I would be sorry to commit myself to the opinion that in no case should a work be executed from loan capital unless it promised to realise 6 or 7 per cent; I think that there may be possibly some cases in which a work, if it promised some moderate return, say 3 or 4 per cent., and if it promised greatly to increase the general prosperity of the country, and therefore its general revenue, and if it promised to relieve the Government, and the country from famine relief expenditure; if it had all these combined advantageous features it might, I think, be possible to sanction the execution of such a work from loan capital; I also think it possible that in the execution of such a work loan capital and the ordinary current revenue might be associated; that, for instance, half the cost of the work might be defrayed from loan capital and half the cost might be defrayed from the current ordinary revenue. I merely state these impressions from the extreme reluctance which I feel to abandon such works as those I have described in connection with the Ganjam river or the Perryaur project, the second work to which I alluded.

3143. You are influenced by two considerations; you would not wish to relax the statutory rule that out of borrowed capital only those works which are likely to be remunerative are to be constructed, and on the other hand, you think there are exceptional and occasional instances where it might be under the conditions you state advisable to relax that regulation?—I have the strongest feeling that works should, as a general rule, only be executed from loan capital when they

Chairman—continued.

they promise a remuneration equivalent to 6 or 7 per cent.; but at the same time there are some parts of the country in such an unhappy condition in consequence of the want of water, and which are so susceptible of improvement and development by the application of water, that I cannot give up the hope that some exceptions might be sanctioned.

3144. The financial danger, of course, is that whereas the outlay is certain, the return must, to a certain extent, be uncertain; would you anticipate that there would be any dangerous increase to the debt of India from the accumulation of loans contracted for public works, if your suggestion were acted on?—I am bound to corroborate entirely the statement which your Lordship make that the outlay is certain, and that the returns are problematic. The outlay is so certain, that I do not think it possible to adduce a case of a recent irrigation work especially of a mixed character in the Madras Presidency, which has not, in some degree, exceeded the estimate. The cost of a complex irrigation work, such as I have alluded to, cannot possibly be accurately estimated. The outlay is almost sure to exceed the estimate. I think that the returns would generally not disappoint the Government. I think that generally speaking the water would be taken and well paid for; but still the danger of undertaking complex works of a novel character from loan funds is so great that, if such works were largely undertaken in India, I think there would be the greatest danger of an immense increase to the National Debt of the country. My feeling is so strong upon that subject, that in case such works should be extensively undertaken, I do not think it would be justifiable on the part of the Supreme Government of India to contract loans without provisions for the reimbursement of the capital of those loans as well as the interest. I entertain a very strong impression of the danger of allowing the public debt of India to go on increasing without some provision for the repayment of the capital. There is at the present moment no provision whatever for the reduction of the capital of the Indian debt. Under any circumstances it would be desirable to make such reduction; but if the public debt is to be added to by loans for speculative complex irrigation works, it would be a most calamitous policy to make such loans without making provision for the repayment of the capital.

3145. Then, to counteract the danger which you have very clearly stated, you propose, that when those loans are raised, there should be a sinking fund provided for their repayment over a certain number of years?—I do. When I consider that the capital of the National Debt of this country is systematically paid off, and that it forms part of our system, that that should be done, and that it forms part of the system of the more economical nations on the Continent, also that that should be done. I think the same principle should be applied to India, especially if loans are to be made for speculative works of the nature to which I allude.

3146. We have had a good many suggestions made to us as to the possibility of introducing local taxation or cesses for the payment of the interest of loans which have been contracted for irrigation works of public utility; have you ever considered those suggestions?—My impression is

Chairman—continued.

Right Hon. Lord *Napier and Ettrick.*

11 July 1878.

contrary to all the proposals that I have ever heard of that nature. The proposals which I have heard alluded to I think might be classified under two heads. I have heard it proposed that a general impost or assessment should be laid upon the province which is to be benefited by the development of irrigation works, and that this special impost or cess should be applied towards the payment of the interest of the loan or the extinction of the capital. I have also heard it suggested that there should not be such a general impost on the province, but that the cultivators to whom the water is offered, and by whom it might be profitably used, should be charged a wet assessment upon the land whether they take the water or whether they do not. I object to both proposals as applied to Southern India. There is in Southern India a rooted impression amongst the people that water should only be paid for by the individual to whom it is supplied when he receives and uses it; and I think that any proposal to make the general community responsible, or to make an individual responsible for what he does not take, would produce such an amount of discontent in the country that no Government could equitably or safely sanction such a system.

3147. I suppose we may assume that, from your experience, the ryot sufficiently knows what is for his own advantage, as to be sure to take the water if it would enable him to produce heavier crops?—I would not say that I have such perfect confidence in the ryot. I think that there may be parts of the country in which the ryot enjoys a very tolerable condition in ordinary years under the system of dry cultivation, and in which he would nevertheless be greatly benefited if he accepted the water offered by the Government; in such localities the ryot by force of habit, and in order to avoid the outlay of capital and labour which is necessary to convert dry cultivation into wet cultivation, may be blind to his own eventual and permanent interest, and hesitate to take the water much longer than he should.

3148. But you would not be in favour of stimulating him by assessing him whether he took the water or not?—No, I would not.

3149. Is the expansion of irrigation likely to be carried out rapidly?—I consider that it is impossible that the expansion of irrigation in any part of the country, except upon the deltas, can be carried out rapidly.

3150. That is to say, that although the work may be really capable of irrigating a very large amount of acreage, yet it would be a considerable number of years before the inhabitants sufficiently appreciated the advantages of wet cultivation, to fully utilise the water which has been provided for them?—When I stated that irrigation works could not be rapidly expanded, I had rather in my mind the difficulties connected with the construction of the works than the reluctance of the cultivators to benefit by them. I think that the reluctance of the cultivators in the Madras Presidency would be exceptional; but I think that the difficulty of selecting, surveying, designing, estimating, criticising, sanctioning, and completing irrigation works in India is so great, that no irrigation works, except those of the deltas, can be undertaken and executed, except after, I may say, a long series of years; it takes five or six years to examine, sanction, and commence an irrigation work in the Madras Presidency.

3151. Does

Right Hon. Lord *Napier and Ettrick.*

11 July 1878.

Chairman—continued.

3151. Does your Lordship think that there are too many impediments, at present, in the way of rapidly executing irrigational projects?—I think that the impediments belonging to the nature of the case and the character of our establishments, are invincible. No irrigation work can be wisely adopted rapidly, and I should be at a loss to suggest any expedient by which those natural causes of hesitation and delay can be mitigated, in connection with the character of our establishments.

3152. Then you believe that the present constitution of the Public Works Department does, to a certain extent, prevent the rapid execution of irrigation works?—I believe that it would be impossible to contrive any system of public establishments by which irrigation works could be rapidly expanded. From the natural impediments, if the work is to be good, and if the agency is to be honest, it is impossible that the development of irrigation can be otherwise than deliberate.

3153. And you would not be anxious to remove any of the natural impediments which you have enumerated?—The financial difficulties are very great, and as I said before, I think it possible that some concession might be made in individual instances for the use of loan funds, and it may also be possible that our establishments might be in some measure expanded and improved; but I am not sanguine that any alteration in the character of our executive establishments would accelerate the safe and efficient execution of public works.

3154. Then the checks, numerous and various as they are at present, are not in your opinion too great to insure a return upon the works which may be sanctioned by the Supreme Government?—All the checks in my mind which exist at the present moment are indispensable, and all combined will not secure the Government against error and disappointment.

3155. As your Lordship is aware, during the last few years a college of civil engineers has been established in England in order to afford the Indian Government an annual supply of young engineers; do you anticipate any great result from the institution of that college?—I do not anticipate any material result. To my mind the best agency which could be devised for the conduct of public works in India was the old establishment of the Royal Engineers; so long as the Royal Engineers belonged to the Government of India, and were under its authority, and could be appropriated to the civil works of the country, that was the best agency which could possibly be supplied from any of the sources that were at command. When the amalgamation was introduced, that is to say, when the Indian Engineers were amalgamated with the Queen's Service, when the Indian Government could no longer command their services, and those military engineers were allowed to select the civil or the military branch of their profession as they pleased, then that source became an unreliable one; and although I still think that the individuals may be the best, the system was no longer competent for the demand, and it became indispensable for the Government to establish a civil engineering college capable of supplying India with the very highest quality of science and character; but it would be vain to suppose that any civil engineers will ever supply a class

Chairman—continued.

of officers superior to the military, or in some respects equally useful.

3156. You have mentioned, I think, the Royal Engineers; do you not mean the old local corps of Indian Engineers?—Yes; they are all Royal Engineers now.

3157. We have had different opinions from different witnesses as to the possibility of more largely employing native agency in the subordinate grades of the Public Works Department; has your Lordship ever considered that question?—That is a question which is associated with the general question of employing natives in position of trust, responsibility, and honour. You have asked me whether I have considered the question of employing natives in subordinate positions; I would rather that the question had been put to me in the form of employing natives in subordinate positions, and employing them in high positions. I think it is most important that some avenue in the Public Works Department should be found for the employment of the highest class of native ability.

3158. Do you believe that that engineering ability can be found amongst the natives?—I think if we look to history, and look to the experience of competent persons, that in all probability that description of ability might be found. We see from the monuments of the country, erected both under the Hindu and under the Mussulman Governments, that the natives of both races were capable of the design and construction of both sacred and secular works of a very important character. It may therefore be inferred, that that sort of ability and that sort of taste has not died out, and become extinguished in the native races. But besides that I have certainly heard it stated by practical men and competent judges, that the natives do possess both the scientific and the organising faculty necessary for high employment in the construction of public works; the doubts which I have heard expressed had reference more to their honesty than their ability.

3159. There is no college in Madras, is there, to which natives have admission, and through which they can at once obtain employment in the Public Works Department?—Yes; there is a Civil Engineering College at Madras to which natives, East Indians, and English officers in the Queen's Service and the Native Army repair for the purpose of instruction, and in which they qualify for employment in the Public Works Department. There is, therefore, an avenue by which the natives and the Europeans in Madras can obtain access to employment in the Public Works Department; but the pressure for high employment on the part of the Royal Engineers, and now on the part of those who obtain their education in the Civil Service, will, I am afraid tend to crowd out the aspirants from the native community.

3160. Is the number of students limited at this college?—I cannot now state the details.

3161. But the practical effect of allowing Europeans, military and civil, to compete with natives in this college does naturally very largely diminish the number of natives who can through this college get employment in the Public Works Department?—What I am afraid of is, not the competition of East Indians and Europeans in the Madras College; it is the competition of the

Royal

Chairman—continued.

Royal Engineers and the students in the Civil Engineering College in England.

3162. Are a certain proportion of those students at this college obliged to be Europeans?—No; I do not remember, at this moment, that there is any limitation. So far as I remember all classes are freely permitted to repair to the college for instruction, who are capable of receiving that form of education. I never heard that the power of giving education was so limited; what I have heard is that the opportunities of employment and promotion were limited, and that limitation is now aggravated, as it were, by the institution of the Civil Engineering College in this country, of which, however, I fully recognise the necessity and utility. I think that some specific provisions are necessary in favour of natives of the highest capacity for such work; some special provision is necessary to enable them to obtain high employments in the Public Works Department.

3163. Then if the natives do not avail themselves in large numbers of the educational course afforded by the college, it is because after they have passed through that college they have not sufficient prospect of employment and promotion, as compared with Europeans?—I would at any rate say that I think that if natives are not in fact permitted to obtain those employments in the Public Works Department that must necessarily discourage them from devoting themselves to that branch of the public service.

3164. In what direction or manner would you increase the facilities to natives for employment in the Public Works Department; would it be, in your opinion, advisable that these engineering colleges in India should be attended by natives alone?—No, I do not think so. I have never considered that point particularly; but my first impression is that that is not necessary or desirable.

Mr. *Onslow.*

3165. In what direction would the special facilities which you suggest go?—It is a subject to which I have not given my attention particularly; but in thinking about the matter recently, it appears to me that the very best avenue now open to natives for high employment in the Public Works Department of India would be through the Civil Engineering College in this country. If natives could be got to come over and qualify along with Englishmen in the Civil Engineering College here, that would, of course, secure the highest quality of ability and of character; and I ask myself whether, perhaps, the Government of India might not, if they have not already done so, afford selected natives facilities for coming over and obtaining their education as native students in the Civil Engineering College here.

3166. By that, do you mean that the Government should pay for their education?—Yes; for the education of a limited number who have qualified themselves by passing an examination in India equivalent to the competitive entrance examination in this country.

3167. Would not it be rather an anomaly that one class of engineers should be paying their own expenses in the Engineering College, and the Government be paying the expenses of another class?—No, I think not. It would be open at this moment to any college, or public institution, or individual, to found a bursary or scholarship

Mr. *Onslow*—continued.

which a candidate might obtain, and which would defray his expenses in the Civil Engineering College here; and why should the Government of India not found such bursaries?

3168. But the number of bursaries must necessarily be limited?—One would do good. My remarks point to this fact: that we are giving in India the highest description of education to a considerable number of persons, and along with this education, instilling into their minds ambitions and aspirations; but we are not affording sufficient means of satisfying them. I think, therefore, that wherever it can be profitably and safely done, the natives should be admitted to a share of the highest honours and emoluments of the Government; and I think that the Public Works Department is one of those departments into which they might be prudently admitted, without prejudice or danger to our Government.

Sir *Joseph M'Kenna.*

3169. Do you not think that those desirable results which you contemplate would be equally attainable by having facilities for those natives in the College in Madras ensuring that a certain number of qualified students should be admitted without the chances of their being crowded out?—I do think so; I suggest that they should be encouraged to come to England as one expedient; but I think that as an alternative expedient, there might be a system of examination in India itself, that is to say, that equivalent tests should be presented to the native aspirant in India, that he should qualify there under approximately the same tests as are prescribed in this country, and that a specified number of employments should be reserved for him. I think that both systems, or either system, might be tried, but that the first system might in some respects be preferable, and it has more analogy with the system now pursued with regard to the Civil Service.

3170. You, however, contemplate that it would be advantageous to use both agencies?—Both or either; anything by which a freer avenue should be opened to native genius for the higher employments in the Public Works Department than at present exists; but I propose to move very prudently and slowly in that direction.

Chairman.

3171. Your Lordship's view would be that, without going very much into detail, you would wish, by some means or other, the utilisation of native talent to a greater degree than is at present the case in the Public Works Department?—That is so.

3172. Since the establishment of the Cooper's Hill College no free professional agency or civil engineers have been employed by the Indian Government; do you think that is an advantage or a disadvantage?—I think, on the whole, it is an advantage. The Department of Public Works is not extensive enough for the encouragement of talent derivable from every source. I think that the employment of natives is of more importance in a political and social point of view than the employment of free candidates from this country, and I do not think that the class of officers obtainable from this country by free selection in the market would be most desirable.

Right Hon. Lord *Napier and Ettrick.*

11 July 1878.

Chairman—continued.

3173. There was a Bill that pssed through Parliament some few years ago by which the members of the Viceroy's Council were increased by the addition of a Minister for the Public Works Department; I think at that time your Lordship expressed your disapproval of that proposal; have you considered the subject at all since, or do you still adhere to that expression?—I adhere most decidedly to the opinion that it is not desirable that the conduct of the Public Works in the Council of the Government of India should be committed to a professional man.

3174. Would you prefer the system which was in force before, by which an ordinary member of the Viceroy's Council, or the Viceroy himself, took charge of that department?—I do prefer that system. In saying this I do not desire it to be supposed, as I have already stated that any of the provisions for the scrutiny of the Public Works below the Supreme Council could be dispensed with; but I think that the system of scrutiny and control is so elaborate and so complete that by the time a public work is actually presented in Council no possible advantage can be obtained by the exercise of further professional judgment upon it, and I am under the impression that the description of professional judgment which would be applied to it by such a member of the Council would often not be of the most competent character.

3175. We have had a considerable amount of evidence as to the relations between the local governments and the Supreme Government with regard to the sanction of Public Works Extraordinary; your Lordship has acted both as Governor of Madras, and as Viceroy; would you be in favour of giving a greater liberty or power to the local governments for the sanction of the execution of Public Works from loan funds?—Certainly not. I think that all the restrictions employed by the Supreme Government at the present moment are necessary, and that all the power deposited with the Viceroy is necessary where loan funds are concerned, and I should even say that the application of ordinary funds should be placed under the control of the Supreme Government in the degree in which it is at the present moment where works of any importance are concerned. You cannot safely entrust the local governments with the application of the general revenue or loan funds without a large measure of control on the part of the Supreme Government.

3176. Could you describe what the exact procedure would be, assuming you to be the Governor of Madras, and you wished to obtain the sanction of the Supreme Government to some scheme for the promotion of irrigation; how would the scheme be originated, and through what ordeal would it pass before it finally came up to the Supreme Government?—When I was in Madras I think, practically, the course followed would have been this: The Board of Revenue, or the collector of the district, or the secretary in the Public Works Department, has some knowledge of the locality in which an irrigation scheme might be introduced, or promoted, or improved; the subject would be brought under the consideration of the Council, and be talked over, and if there was a *primâ facie* probability that the scheme was of a profitable nature, authority would be given to the district

Chairman—continued.

engineer to inquire into it, and report upon it. The district engineer would employ the executive engineers in the examination of the locality; a survey would be made, and some rough estimate would be prepared; the scheme would be considered by the district engineer, and perhaps referred back to the executive officer. At any rate it would be corrected and improved, and it would be sent up to Madras to the secretary in the Public Works Department. If it was an irrigation scheme, it would be submitted by the secretary in the Public Works Department to the consideration and scrutiny of the consulting engineer for irrigation, or an officer, under some other name, filling that function. When the scheme had been matured in this way, it would be reconsidered by the secretary in the Public Works Department, and brought into the Council. In the Council, the scheme would then be compared, not on professional grounds, but on grounds of policy, with other competitive schemes of the same character, and if the Council conceived it to have a preferential claim to their support, they would then send it up to the Government of India. Before the Government of India it would be considered, I suppose, by the secretary in the Public Works Department of the Government of India, and referred by him to the consulting engineer, for irrigation. We suppose it is an irrigation scheme; then the scheme would be most carefully examined by the consulting engineer, and by the secretary in the Public Works Department of the Government of India. Their attention would be very much sharpened on the subject, and I am not sure that sometimes some degree of professional jealousy might not aid their vigilance. At any rate they would be very careful in their scrutiny of the scheme, and in all probability they would find some reason to hesitate about it, and it would be sent back to Madras, I am sure, for further inquiry and further consideration. It might be sent back three or four times before a decision on the part of the Department of Public Works of the Government of India was taken. After all this precaution, if it was sanctioned by the department, it would be brought into the Council of the Government of India, and then it would be compared, on general grounds of policy, with other competitive schemes, and it would either be approved or rejected.

3177. Then you have a very long chain of officials and authorities through which every scheme has to pass before it can receive sanction from the Supreme Government?—A very long chain; and, long as it is, it will not protect either the local government or the Government of India from deception and from error.

3178. And long as the chain is you would not propose to shorten it?—I could not shorten it.

3179. You have described certain classes of works; a certain number of those works would fall within the category of public works extraordinary, as laid down by the Supreme Government; that is to say, they would be works which would give a fair hope of a return sufficient to meet the interest upon the outlay; there would be other works of a smaller character, the returns from which would be more uncertain, such as tanks; have the local government now sufficient facilities for the prosecution of those smaller works?—They are now not able to appropriate a sufficient amount of money for repairs and restorations.

Chairman—continued.

storations. The funds at the disposal of the local governments of India and of the Supreme Government are never sufficient for the demands upon those funds in any department of the administration. They are certainly not more competent in the Public Works Department than in any other. They do their best, but there will always be a great deal of desirable work left unperformed.

3180. Then, as Governor of the Presidency, I believe you had the power of sanctioning a work which would not cost more than a lac of rupees?—Yes, sanctioning the work out of current revenue.

3181. That is to say, out of ordinary expenditure?—Yes.

3182. Would you propose to increase the power of the local governments as regards those small works?—I have never considered that question specifically; on the whole, I think that it is desirable that the system of provincial funds should be extended; that is to say, that the Government of India should give to the local governments certain funds to be entirely under their control, which they may expend at their discretion or in their own judgment; and it is possible that their discretion might be enlarged, but I cannot at this moment say to what extent; I can say that I never felt the power of the Government of India to be onerous to me while I had the honour of being employed in the position of Governor of Madras.

3183. Then you would not propose any great alteration of the principles or relation now existing between the local and the Supreme Governments as regards the expenditure of borrowed money?—No alteration whatever with regard to the expenditure of borrowed money, and no considerable alteration with reference to the expenditure of ordinary revenue; but I think that the principle of provincial funds might be expanded, and might be more equitably arranged with reference to the several local governments.

3184. There was a Commission sat some 24 or 25 years ago upon the system of public works which was then in force in the Presidency of Madras, and I believe they proposed, and their proposal was adopted, that tanks and various small irrigational works in the different collectorates should be handed over to the Public Works Department, and taken away from the control of the civil agency; did you ever consider that question, or did the present system, by which the Public Works Department have control over those works, seem to you to work satisfactorily?—It would be a good deal to say that the present system always works satisfactorily; that is to say, a great deal of useful work remains undone; but I do not think that it remains undone, because it belongs to the Public Works Department, and not to the Civil Department. The work remains undone because there is not money enough to do it, and because the establishment is not capable of overtaking all the work which they should perform. If your Lordship means to ask me whether I think the present system could now be altered, and whether any considerable portion of the public works could be restored to the management of the revenue authorities, I think not; I think that in that respect the die is now cast, that the present system has worked too long. We have got so completely into that groove, that the Department of Public Works must really remain in the management practically of all the irrigation works in the country. The civil authorities have now many duties to perform which they had not before; and the description of works which would now be entrusted to them are of such a very complex and scientific character, that they would not be able to perform them even if they had time.

3185. We have inquired, to a considerable extent, into the results of irrigation in different parts of India, and its effects upon the health of the people in the vicinity; did you, whilst you were Governor of Madras, give any special attention to this point?—Some casual attention at least I have certainly given, and it always appeared to me wonderful in Southern India how healthy the most irrigated country was. Whereas in the United States and in the north of Italy the irrigated country is most deadly, almost uninhabited in some cases, there are districts in the Madras Presidency which are actually drenched and saturated with water for a very large portion of the year, and which are healthier than the driest elevated plateaus, healthier than the woods, healthier even than the hills. As a general rule, irrigated ground is the healthiest ground in the plains of Southern India. But there are some localities which appear to be exceptions to this rule; there have been occasional periods when irrigated spots have become unhealthy.

3186. The inhabitants of the delta have been free from that malaria and fever which has attended the extension of irrigation in Northern India?—I should say, generally speaking, that the irrigated ground under the tanks is perfectly healthy. The irrigated grounds along the banks of the rivers, so far as I remember, are generally perfectly healthy. The delta of the Cauvery is perfectly healthy, I may say exceptionally healthy, and the deltas of the Godavery and the Kistna have always been up to the present time considered healthy districts. But there have been of late years examples of fever in those two deltas, which I believe are exceptional, and which I trust are transitory. There is only one place, so far as I remember, where a serious outbreak of malarious fever happened to occur in connection with irrigation, but whether it was a coincidence, or whether it was cause and effect, I do not think was ever very satisfactorily proved.

3187. And with those exceptions, the health of the inhabitants in the irrigated districts is good, and the mortality is less than in other parts of India?—I would not like to say that the rate of mortality is lower than in other parts of India, because I do not speak from distinct recollection, but I will say this, that the irrigated districts are generally considered healthy districts, and that I would not allow the apprehension of injury to the public health to limit my irrigational operations if they could be profitably undertaken in other respects. But as there have been particular instances in which the application of water to the soil appeared to connect itself with fever, I think that inquiry should be made in those cases as to the nature of the soil, as to its component parts, and its geological formation; that that question should be studied with the view of ascertaining whether the application of water to some descriptions of soil is less healthy than its application to other descriptions of soil. There was an impression when I was in India that a soil composed of crumbling rock was unhealthy. I have heard

Right Hon. Lord *Napier and Ettrick.*

11 July 1878.

Chairman—continued.

it stated (but it was a mere vulgar impression) that such soil was unhealthy at all times, and unhealthy when brought into contact with water. It is merely a thing which I have heard affirmed, but the subject is one which, as far as I know, has not been inquired into.

3188. And in this particular instance, was this prejudice at all confirmed by facts?—I do not know; I cannot say. There was a great outbreak of fever at Kurnaul in connection with new irrigation, but I remember being assured that the fever appeared in villages in the neighbourhood which could not have been influenced by the irrigation, and the same fever had appeared at various times in remote periods.

Sir *George Campbell.*

3189. I think you said that you would not be deterred from prosecuting works of irrigation on account of a fear of unhealthiness. I want to ask you whether your opinion is confined to the Presidency of Madras, or whether having regard to what you have stated with reference to the unhealthiness which has attended irrigation in Italy and in America, you would extend that opinion to Northern India?—From what I have heard, most certainly I would not extend it to Northern India. I have been told, though this is merely general impression, that the irrigation of land is by no means so healthy in Northern India as generally in the Presidency of Madras; and even in the Presidency of Madras I think that phenomena have appeared in both the deltas which require study. I believe that there was one year in which a portion of the Godavery delta was less healthy than usual or even unhealthy, and it was referred to a specific fresh or flood which had come down at an unusual period of the year. And there was also a period during which a great deal of low fever prevailed in the Khistna district, respecting which, I think, a special inquiry was ordered by the Government of Madras, and it was asserted that the increase of fever in the irrigated districts probably had some connection with the stagnation of the water, and the want of proper provision for its outfall after the irrigation had been completed. The great proof that irrigation properly managed ought to be perfectly healthy, after a reasonable period of use, is the perfect salubrity of the Cauvery delta.

Chairman.

3190. You have stated very clearly to the Committee your views as regards the extension of irrigation in Madras, with a view to the mitigation or prevention of famine; would you wish to add anything as regards the extension of railroads, or would you wish to draw any comparison between the comparative utility of the two different kinds of works, railroads and irrigation, as a means of averting death from famine?—I have not come here prepared to draw any parallel between the two agencies, either in a preventative or a remedial point of view; but I might say, generally, that the extension of irrigation is preventative in its tendency, and that the extension of railroads and communications is remedial; that the one tends to prevent scarcity, and that the other tends to relieve it when it occurs. I do not wish to undervalue the importance of railroads at all; but with a view to the prevention of famine, or the prevention of scarcity, I shall always think that the extension of irrigation

Chairman—continued.

should be a capital object of the Government of India.

3191. If the Indian Government were therefore able to devote a larger annual sum than they have hitherto done to the prosecution of public works in Madras, with a view to the prevention of famine, you would prefer that outlay being employed in irrigation works, such as you have described, rather than in the extension of railways?—Both should be employed, but irrigation is of more importance than railways.

3192. Assuming that you had a certain sum handed over to you as the Governor of Madras, with absolute power to dispose of it as you chose, you would give the preference to the things which you have laid before us?—At this moment I would employ it for the purpose of irrigation.

3193. Do you think it is practicable in the financial exigencies of the Indian Government to give Madras, by the extension of irrigation, a tolerable immunity from drought and famine?—I do not think it is possible to prevent famine in the Presidency of Madras. There are vast regions in the Presidency of Madras, lying at a high level, with a very precarious rainfall, and a very small rainfall at the best. There, I think, when there is a failure of two consecutive monsoons, the phenomena of famine will always appear, and all the phenomena of which we have had experience up to the present time; but the area of such scarcity may be in some degree limited, and the power of the people to help themselves to resist such calamities may be materially increased; the moment will, however, at last arrive when the people can only be kept alive by being fed by Government, and then the Government will feel the advantage of possessing railways. It is impossible to do away with the contingency of famine in Southern India, in my opinion, do what you will.

3194. In advocating a somewhat increased outlay upon public works in Madras, you would deprecate the extension of tanks or irrigation works, which are entirely dependent for their supply upon the local rainfall?—Yes, I would.

Sir *George Campbell.*

3195. I understood your Lordship to say that the money which was required to complete the irrigation works in the three great deltas certainly ought to be expended; I think we have been led to suppose that in those deltas which are well irrigated already, anything necessary to complete or to secure the works of the Godavery and the Kistna is now in course of expenditure; I should like you to tell us whether you have any reason to suppose that there is any large portion of those deltas which ought to be irrigated, which has not yet been irrigated, or is not likely to be irrigated by works which are in course of construction?—First, with reference to the extent of ground which still remains to be irrigated in those deltas, opinions vary considerably upon that subject. My own impression is this, that under very favourable circumstances, in all probability, and relying upon the opinion of a most competent officer, there are still in connection with the Godavery delta 400,000 acres to which water might be applied. In reference to the delta of the Khistna, the official statement, which is certainly not beyond the truth, is that about 274,000 acres might still be irrigated, and it has been stated to this Committee already

Sir *George Campbell*—continued.

already in the course of this inquiry, that about 300,000 acres might still be irrigated in the Cauvery delta; that makes nearly 1,000,000 acres of ground which might still be irrigated in the three deltas. I believe that the works in the Godavery delta are being prosecuted with tolerable regularity. My impression is that the Khistna district is at the present moment neglected. I have no information about the rate at which the development of irrigation is being prosecuted in the Cauvery. Although a good deal is being done in the deltas towards the development of irrigation, I am also under the impression that the works might be more actively prosecuted.

3196. Can you tell us whether any projects for increasing the irrigation of those three deltas have been submitted by the Government of Madras to the Government of India, and have not been sanctioned by the Government of India?—No, I cannot state that.

3197. Do you remember whether, in your time, it was so in reference to any scheme for those three deltas?—No. Reflecting upon the course which my own Government pursued, if any reproach can be addressed to any one, I think it might most properly be addressed to the Madras Government, and in some degree to myself.

3198. Do you think that the ground upon which this extension of irrigation, in your opinion, would be possible, is ground which admits of the same facilities for irrigation as the existing irrigation; or are there difficulties which may render it more disputable and more doubtful whether the extension of irrigation would be as profitable as the original irrigation?—I believe that the extension of irrigation might be as profitable as it has been up to the present time.

3199. Then as regards the smaller deltas of which you have told us, where something might be done, I think you mentioned the delta of the Pennair and of the Tambrapoorney; where is the Tambrapoorney?—The Tambrapoorney is the southernmost river in India, in the district of Tinnevelli, which is the site of very ancient irrigational works upon a moderate scale. When I was in India the Madras Government ordered a scheme for the completion of the irrigation work from that river, which is, I believe now nearly completed, called the Strevaguntum Annicut. The irrigational project upon the Pennair River is more important; it is called the Sungum project; it is one of very considerable extent, and has the character, in a great measure, of delta work; but it has, I believe, been laid aside by the Government of India.

3200. Then are we to understand that the works in the Tambrapoorney which are nearly completed are those which you think necessary and right, or do you refer to some greater scheme which you think might be carried out?—Yes; I believe that the Tambrapoorney works are now nearly completed, or are completed, and that if the irrigation of that river could be supplemented or improved, it would now have to be by the creation of storage reservoirs in the hills.

3201. You have nothing more which you could recommend with complete confidence, in the case of Tambrapoorney?—No, nothing.

3202. As regards the Pennair; does the Pennair in any degree derive its water supply from the Western Ghats?—Not strictly from the Western Ghats, I think.

3203. Has it any large and reliable water supply in the dry season, upon which dependence could be placed in a season of extraordinary drought and famine, that would not fail?—The water supply is sufficiently reliable, in my mind, to justify the extension of irrigation. There have long been irrigation works on the Pennair River; the works on the southern bank of the river are extensive under the annicut, and I never heard that they had suffered from the want of water in the dry season. The project to which I allude is a project for extension on the north bank of the river. It is called the Sungum project; and I have no reason to doubt that there then will be a sufficient water supply of a tolerably reliable character.

Sir *George Campbell*—continued.

Right Hon. Lord *Napier and Ettrick.*

11 July 1878.

3204. Are we to understand that for the present that project has been rejected by the Government of India?—I am now speaking of events which have taken place long after I left India, but I have understood that the Sungum project has been shelved at the present moment, partly, I presume, because it was not proved to be of a very profitable character, and partly because it was not considered of pressing necessity for the relief of famine.

3205. Then we may assume, I suppose, that it was a scheme with regard to which there is room for difference of opinion?—There is room for difference of opinion, but at the same time I should be inclined to think that under a liberal view of the application of loan funds, the Sungum project is one of those which promises well.

3206. You have given us the history of the Ganjam project; may I ask whether, with the exception of these three projects, the Tambrapoorney, which has already been sanctioned, and is nearly completed; the Pennair project, the history of which you have now described, and the Ganjam project, which you have also described, there is in any other coast or delta project or possibility to which you could draw the attention of the Committee?—There really is no delta project properly so called, beyond the three great deltas, upon which I feel strongly at the present moment (that is on my present information), except the Sungum project, and the Pennair one.

3207. May we assume that unless it be in the case of the extension of the three delta projects, there is no other irrigation project, the benefits of which are certain and palpable, and not admitting of a difference of opinion?—I know at this moment of no irrigation project, except the irrigation of the three great deltas, of which the profits are certainly large and indisputable.

3208. I think you have told us that, putting yourself again in the position of the Governor of Madras, and supposing that a considerable sum were placed at your disposal by the Government of India for the prosecution of public works, you would prefer to prosecute irrigation works rather than railways; I should just like to ask how far you would carry that view; I assume from what you have said that probably you would think it right to carry out the Sungum project on the Pennair; but I think you have also told us that almost all the other projects are projects of great difficulty and doubt, requiring very grave and very long consideration, and which could not be very speedily carried out; and I would ask you this: supposing that the Government, adopting the views of a witness whom we have had before us, Sir Arthur Cotton, were to devote a number of millions a year from borrowed funds

Right Hon. Lord *Napier and Ettrick.*

11 July 1878.

Sir *George Campbell*—continued.

to the prosecution of canals and railways, would you be prepared to spend several millions in the Madras Presidency within the next two or three years upon canals, in preference to any railway schemes with which you are acquainted?—I am not prepared to spend money in the Madras Presidency in the course of the next two or three years at all except in the deltas, and perhaps on the Sungum project.

3209. Then as regards the deltas, you have told us that you think it is quite beyond doubt that there the irrigation works have certainly been profitable and productive, and have returned a large per-centage, and have really benefited the country; and I think you told us, as is certainly the case, that a very large surplus produce of food has been thereby produced; is it the case with regard to the delta irrigation in the Madras Presidency that to a certain extent the irrigation cultivation is almost exclusively devoted to the production of food, principally in the shape of rice, and that food cultivation has to a great extent ousted other cultivation; for instance, are you aware of that which I have heard stated, that in the delta of the Godavery, before the irrigation works were introduced, a great deal of cotton was produced; that that cotton has been ousted, and that a very large and more profitable production of rice has been substituted?—I believe that a general monotonous cultivation of rice has been substituted for the variegated primitive cultures; but I should imagine that where any particular crop like cotton has been displaced by rice in the delta, the cultivation of cotton has been so increased in other parts of the country as amply to compensate the whole country for the local loss.

3210. That is just what I am coming to; do you not think it is the case, that the cultivation of food must be to a certain extent limited by the necessities of the country and the demand for exportation, and that if you oust other crops and produce a large surplus produce of food in certain parts of the country, the probability will be that the cultivation of food would be diminished in other parts of the country, and that the cultivation of crops other than food crops will be substituted?—I do not quite gather whether you mean that if there is a great development of the cultivation of food in the deltas, that the ground in other parts of the country might go out of cultivation.

3211. No, I mean that the land might be devoted to cultivation other than the cultivation of food crops?—I do not think that the development of produce available for export or manufacture, such as cotton, has limited the cereal cultivation of the country, for they go on increasing hand in hand. In those parts of the country where there has been an increase of cotton production there has also been an increase of the area of corn cultivation, the people have been enabled to extend the whole area of cultivation, and have encroached upon the waste.

3212. Has your Lordship's attention been much called to the question of cotton cultivation, and to the question whether, inasmuch as a very large quantity of cotton of the very finest kind is produced in Egypt solely by irrigation, the same system might not to some extent be pursued in India?—My attention has never been specifically called to that; I imagine that the question of the growth of cotton under irrigation is one which is much more being studied in Northern India and in the Bombay Presidency than in Madras.

3213. Can you tell us whether any cotton is grown by irrigation in the Madras Presidency?—It must be quite the exception.

3214. A good deal of cotton, I take it, is produced in the Madras Presidency?—Yes, a good deal; but I have no personal experince that it is produced as a wet crop; as a rule, it is produced entirely as a dry crop.

3215. Has your attention been at all turned to the question whether the stimulation of the soil by irrigation, in the case in which successive crops are produced in the same soil in great abundance for a long series of years has any tendency to exhaust the soil?—I never heard that fact affirmed when I was in the Madras Presidency. It seemed always to be assumed that, assisted by the primitive method of applying manure, if it may be so called, to the wet soil, the power of the soil, with the assistance of water, was unlimited to produce successive crops of rice. In some parts of the county they manure the wet cultivation with leaves and branches; that, so far as I am aware, is the only form of manure by which the water was assisted. The value of the water varies. One description of water was considered to be of a more enriching kind than another. For instance, well water was thought the poorest, and water derived from a living river channel the richest, but I never heard of any water which was considered to be of a sterilising character unless in the case of brackish water from wells.

3216. The water which is principally used for river irrigation in the Madras Presidency is derived from rivers at a time when the rivers are in flood, and bear down considerable quantities of silt; is that so?—Yes.

3217. But the result, as regards the capacity of the soil, might be different in the case in which the water supply is derived from rivers at the time when they do not bear down silt?—The water derived from rivers in flood is richest; the water derived from rivers not in flood is poorer, the water derived from a tank, when the sediment has subsided would be poorer still, and the water derived from a well would be the poorest of all.

3218. Has your Lordship had any experience of the cultivation of wheat by irrigation?—None whatever, I am sorry to say.

3219. Then, as regards the financial view of the question, I think your Lordship said that there might be cases in which it might be justifiable to expend a certain portion of the cost from borrowed money, in the hope that so much of it might be repaid by the productive power of the work, and another part of the cost from the revenue; I should just like to ask your Lordship, who have had such great experience on the subject, whether, in your view, the revenue of India is now in a condition which makes it likely that it should afford the money available for great public works from current revenue?—No, I am afraid not; not for public works of the first class; but there might be, I think, some public works of moderate dimensions, but still of a very useful character, which might be defrayed in part from current revenue, and in part from loan funds; but I have really only thrown out that idea as almost a desperate expedient.

3220. But

Sir *George Campbell*—continued.

3220. But I think your Lordship has told us that, in your opinion, the financial system with regard to those public works must be so far reformed, that a sinking fund should be provided where it is not now provided; you have also told us that the finances of India are in such a state that there is continually not money enough for the repairs, and for many other objects; what I wish to put to you is this: have you any such sanguine view of the revenue of India that, without additional taxation, you think that comparing the revenue and the expenditure, that state of things is likely to be largely improved; do you see daylight with regard to that state of things?—As there is a difficulty in finding the money for our present necessities, there would of course be a difficulty in providing the money for the payment of loans, and not only for the payment of the interest of the loans, but for the redemption of the capital; but still I am of opinion that if large speculative irrigational enterprises are to be attempted, the danger of the accumulation of debt would be so great that a sinking fund ought to be established. If the enterprise proved to be a profitable one, it would pay the capital off as well as the interest; and if it did not prove to be a profitable one, posterity should not be saddled with a burden erroneously adopted by the present generation.

3221. Do you think that under the present circumstances of India, it would be expedient or possible to raise an additional revenue from taxation, with a view to construct public works for the benefit of the country from that revenue?—I would say, on the whole, that the course substantially pursued by Lord Mayo and by Lord Northbrook is the correct one. I would not impose additional taxation to any extent, for the purpose of undertaking public works.

3222. As your Lordship has referred to the course followed by Lord Mayo, is it not the case that in one form or another, by general or by local taxation, Lord Mayo did contemplate and to some extent impose additional taxation with the view of constructing works which would be for the benefit of the country?—He imposed additional Imperial taxes for the purpose of re-establishing an equilibrium of revenue and expenditure, but before his death he contemplated the repeal of that additional taxation. He imposed local taxation or he countenanced the imposition of local taxation in a very moderate degree.

3223. I think your Lordship has said that you rather object to any special taxation for the purpose of irrigation upon those who do not use the water; but I would also ask if your Lordship has turned your attention to the question whether in a case in which the land is owned by one set of people and cultivated by another, in the case in which the cultivators have taken the water, and the rent of the landlords has been raised in consequence, without any exertion or expenditure of capital on their part, you think that in that case it would be fair to impose any special irrigation tax upon the landlords who have in that way benefited?—That is a point of view in which I have never considered the question; I presume it is a point of view which must be more familiar to Sir George Campbell, from his experience in Bengal. You refer, I suppose, chiefly to the zemindars. I have never contemplated increasing the tribute or assessment

Sir *George Campbell*—continued.

of the zemindars under any circumstances. I am not prepared to say that it might not be equitable under some circumstances, but I do not remember that in the Presidency of Madras that subject was ever brought under discussion.

3224. There are zemindars in the northern districts of Madras, are there not?—Yes, there are extensive zemindars; but more than that there is no doubt that there are extensive puttahdars or ryots, in our delta districts, who pay a light assessment to the Government on their irrigated soil, and who sub-let the same soil to other persons at a very great advance of rent; but I have never contemplated the possibility of raising the rent to a person who holds a lease or puttah from the Government.

3225. Do those puttahdars still pay only the original dry assessment; are they not liable to pay the wet assessment?—They pay the wet assessment, and they lease the wet land to other ryots, perhaps, for twice or three times the amount that they pay the Government.

3226. How is it with reference to the zemindars, whose settlement was fixed long before the lands became wet lands?—There were few in the deltas. In the Cauvery delta, which is the delta which I allude to, I presume there are few or no zemindars; at least, I have no remembrance of them.

3227. But in the districts of the Godavery and Kistna, are there no zemindars?—There are zemindars; but the zemindar interest though considerable in the Godavery, is nevertheless small, I think, compared with the Government interest; but I never heard of any contemplated increase of the zemindars' payment or tribute, or assessment. I never heard of an increase of that tribute being contemplated when I was in the country.

3228. But in any case in which there are zemindars ordinarily so-called, is it not the case that that permanent settlement as a settlement was based upon the dry rating, and that they still pay those dry rates notwithstanding that the land has been since irrigated by those works which have been constructed since the period of the settlement?—I am not able at this moment from memory to state how that is arranged, but I will not commit myself to the statement that when water is supplied by the Government to the zemindar he never pays an additional rate.

3229. Is it not the case in the northern districts of the Madras Presidency that the zemindars have no power as a rule of enhancing the rents to the ryots?—I should imagine that practically speaking, they have, in some degree, the power of enhancing the rent, but if they enhance the rent beyond the custom of the country, there would be an appeal to the Collector, and the Collector or the Government would prevent it somehow or other.

3230. Then as regards the public works establishments, your Lordship has, I think, expressed a very decided opinion that the old system under which a local body of military engineers were supplied to India who were employed not only for military purposes, but also to a much greater degree in civil works, was the best possible system; I should like to ask you if you will explain in what particular you think that that system had an advantage over the present system under which young civil engineers

Right Hon. Lord *Napier and Ettrick.*

11 July 1878.

Sir *George Campbell*—continued.

are to be supplied from the Cooper's Hill College?—The preference which I entertain for the old system of military engineers, is founded upon moral considerations; the same amount of scientific instruction can and will be imparted to military engineers and to civil engineers in their respective colleges in this country, but the military engineer will be brought up in greater habits of discipline and obedience; he will have the benefit of the prestige and public respect which belong to the Queen's uniform; he will have the very highest standard of morality and honour in the performance of duty; and he will be available as a soldier when he ceases to be wanted as a civilian. But when I say that, I do not want to impute any want of public spirit or any want of virtue to the body of civil engineers who will be sent out to India.

3231. As a matter of fact, were the Royal Engineers as highly educated in engineering matters before they came to India, as the Cooper's Hill students are?—That is a subject on which I am not perhaps competent to give an opinion; I suppose that the military engineers of the olden days were educated up to the highest standard of the period to which they belonged, and the civil and military engineers of the present time are educated up to the highest standard of the period to which they belong. The question is, whether the education given at Cooper's Hill, is any better than the education given at Woolwich; but whether it is, or whether it is not, in reality, both classes of engineers will have to be formed anew in India itself. They will go out with the highest scientific instruction, and with the highest faculty of acquiring knowledge, but when they arrive in India they will have still to learn their business.

3232. If the present Cooper's Hill College were turned into a college for the supply of a local corps of Royal Engineers for service in India, I presume that your opinion would be satisfied?—I do not propose to turn the college into a military college, I do not propose anything; I only say, that I do not expect that this new institution will in reality give you better officers than you got before, and that the old system sent out men who were soldiers as well as civil engineers. I admit that in a case of emergency in India, every Englishman becomes a soldier, but it does not follow that he will be as good a soldier as a man who was brought up as a soldier.

3233. It is rather a delicate question, but perhaps I might ask your Lordship whether you have any apprehension that the employment of civil engineers would to any degree lead to the introduction into India of that system of commissions which seems to permeate commercial and industrial, and every sort of enterprise in this country?—I have no apprehension that such will be the case as regards those from the college. I hope that the engineers who are educated in the college will imbibe such a high *esprit de corps,* and such a high sense of their duty in India, and of their moral responsibilities, that they will avoid the danger to which you allude. I do not think that the recruitment of civil engineers on the free system in this country would protect you effectually against the danger to which you allude, but I am quite certain that the employment of military engineers does protect you.

3234. As regards the employment of natives, I am not sure whether there have been any very large changes in the constitution of the Public Works Department since your Lordship was in India, but I would ask you this: are you not aware that at present, the Public Works Department of the service is, that one department of the public service in India, in which the natives have greater facilities for rising than in any other department of the service; because the Public Works Department at present constitutes the only one service in which young men who come from Cooper's Hill, young men who are appointed in India, young men who come from the native engineering colleges in India, when once appointed, stand exactly on the same footing, and are eligible for the very highest appointments; whereas in every other department, for instance, of the Civil Service, the great body of the principal appointments are reserved for the covenanted Civil Service; and in the army, almost all the higher appointments are reserved for European officers; and in the medical and other departments, the same is to a great degree the case; therefore I put it whether you are not aware that the Public Works Department is that in which the natives have at the present moment the most open field for rising to the highest appointments of any branch of the service?—What you state is perfectly true in theory, and yet as a matter of fact, I never knew a native in a high position in the Public Works Department, but I have seen natives in the very highest position in the civil government of the country, that is to say, on the judicial branch of the civil government of the country.

3235. Might I ask your Lordship this; with the exception of one or two of the High Court judges who are natives, is there any department of the public service in India in which natives have risen higher than they have risen in the Public Works Department; for instance, is it not the case that we have a good many native executive engineers who, in the Public Works Department may be said to correspond to the district officers in the Civil Department, and that we thus have in the Public Works Department natives who could scarcely have attained to the same grade in the Civil Department?—There are no doubt very few natives who have attained to those higher positions in the Civil Service. They are, as you say, chiefly restricted to judges who sit upon the supreme bench; but that alone is a thing of very great importance; it is a very eminent position given to a native. In the Public Works Department of the Madras Presidency I do not remember any native in any high authoritative or influential position whatever. It may be the case in Northern India, but never saw one in the south.

3236. Is it your Lordship's impression that in the Madras Civil Engineering College the natives have shown a disposition to take largely advantage of the education there given; are the subordinate departments of the engineering service such as may well be filled by natives, now amply filled by well-qualified natives, so that it has not been necessary to resort to Europeans of a lower grade for some of those places which certainly ought to filled by natives, if they can be found?—There are natives in the lower grades, and there are Europeans in the lower grades, and I do not know that the natives are generally of a very satisfactory character; but I think that if they felt that promotion to the higher ranks was practically open to them, it is

Sir *George Campbell*—continued.

is very likely that the natives who now devote themselves to other branches of study, and other branches of the public service, would devote themselves to this. At least, I think that an attempt should be made to induce them to do so. I would like to see a native in the position of a district or superintending engineer, and see how he got on.

3237. Is it the case that there are no natives district engineers in Madras, as there are in the other parts of India?—I never saw one.

Mr. *Onslow.*

3238. What is the pay of a district engineer?—The constitution of the Department of Public Works has been altered very often in India, and I believe that it has been even altered since I left Madras; but when I was in Madras, a district engineer meant the chief engineer in a district or province, who was practically a sort of adlatus to the Collector of the district, for public works.

Sir *George Campbell.*

3239. Your Lordship has stated that there are examples in which natives have exhibited the highest engineering talent; without seeking in any degree to depreciate their capacity, I should like to ask you whether you can point to any instance within historic times in which natives whom we can certainly call natives in our modern sense, have designed and executed great works?—No native was ever allowed to design a work, or ever had an opportunity of designing a work under our Government in the south of India; but I have heard of officers employed upon the Godavery works state that they have had native subordinates, whose names I have forgotten, who exhibited the greatest natural ability for practical work. I have heard Colonel Orr and Colonel Fisher testify to that.

3240. What I would put to your Lordship is this, whether there are now any great works which can be pointed to as having been executed by natives within historic times?—No; many works exist that were not executed by Europeans, and so far you must allow they were executed by natives; but I have always found the very greatest difficulty in ascertaining at what period or by whom irrigational works of every sort were executed in India. There seems to be almost no record of the period in which they were executed, or of the agency by which they were constructed.

3241. With regard to the Cooper's Hill College, I think you will admit that there certainly must be a very large number of European officers in the Public Works Department of India whether we also employ natives or not; and is it not the case, in your Lordship's view, that our European officers must be supplied by young men educated in England, and that therefore any objection to Cooper's Hill College as having a tendency to crowd out the natives would go not to the institution of that college, but rather to the question of the number of engineers who should annually be sent out from that college?—Yes; I do not wish to discredit that college in any respect; I only say that as you still have the Royal Engineers, and as you have the college in addition to them, and as you have to satisfy the aspirant for employment derived from both sources, I am afraid that the natives will be more crowded out even than they were before. If the

Sir *George Campbell*—continued.

Right Hon. Lord *Napier and Ettrick.*

11 July 1878.

bulk of the candidates are brought from the Civil College, and the candidates for the Royal Engineers are materially reduced in number, of course that objection will be mitigated. I perfectly agree that the great majority of the public functionaries in India, of the higher class in the Public Works Department, as in all the departments of the Government, ought to be Englishmen.

3242. When you say that you will still have the Royal Engineers, you do not mean that you have Royal Engineers in the same sense in which you had them before; is it not the case that the supply of the local corps of Royal Engineers has wholly ceased, and that the employment of young Royal Engineers in India is now of an extremely limited and temporary character?—It may probably be becoming more limited. As regards the departments, if they choose to embrace the Civil Departments they may do so.

3243. Then as regards what you have said of the necessity for making special provision to enable the natives to rise to the higher departments of the Civil Service, do I understand your Lordship to consider that the political advantage of giving that encouragement to the natives is so great that you would wish to employ natives in preference to Europeans, even in the case in which for the same money the labour of a European might be the more remunerative of the two?—Yes, I would.

3244. But I suppose only in a limited number of cases?—Only in a limited number.

3245. Then as regards the opinion that your Lordship has expressed that the best way of qualifying natives would be to induce them to come over to this country, has your Lordship considered this view of the case, that the natives as a body have great prejudices against coming over to this country, and would make great difficulties; so that if you wish to obtain the best native talent, the competition for places which you may offer must be very much limited, if you attach to them the necessity of coming over to England; for instance, might it not be, if you had 10 places to offer, that whereas you would have 1,000 competitors in India, you would perhaps not have more than 50 competitors if the condition of coming to England was attached, and that in that way you would be likely to obtain a selection of a more limited character, and consequently of a less high class of talent than if you sought to obtain the best men who could be obtained by some system of selection and competition in India?—I do not think with reference to the population of the Madras Presidency that you would very seriously limit the competition; it would be much more a question of money than a question of caste. If an aspirant was given the means of coming over to this country and completing his studies here, I think that you would probably command the very best quality of native ability; but the suggestion which I make may be one of a superficial character, and I am far from excluding the expediency of competition in India itself; my object would rather be the employment of a few selected officers of the highest character than the employment of a greater number of average persons. I would like to find some means by which you might get a first class native into the higher ranks of the Public Works Department, and I think that by bringing him over here he

Right Hon. Lord *Napier and Ettrick.*

11 July 1878.

Sir *George Campbell*—continued.

would really compare himself with the best standard of European ability, and have the greatest advantages for the cultivation of his faculties.

3246. You are aware, are you not, that at the present moment there are scholarships and exhibitions by which young natives are brought over to this country?—I am unacquainted with the details. I have such an idea before my mind, but I do not know whether they have been founded by individuals or founded by the Indian Government, or founded by the India Office.

3247. I understand you to have expressed an opinion that the Public Works Member of Council ought not to be a professional man; and I apprehend that your Lordship's opinion that a good deal depends upon this; that when a project goes up to the Government of India, it is not simply the project of the engineer of the local government, but it is the project of the local government itself, which local government comprises the governor and the members of the council and others advising upon the question, and that a project which has been sanctioned by the opinion of so high and important a body, is hardly sufficiently dealt with by a single engineer in the Government of India, especially as the inducements which the Government affords are not such as to obtain the very highest class of engineering talent from England; with regard to the opinion of your Lordship, which I hope I have rightly recited, I would like to ask you if you have considered whether, in dealing with questions which are not of a pressing political character, and with regard to which time does not very much press, the Government of India or the Home Government is the better controlling authority in reference to such questions when they are raised and referred by the local governments?—I presume you mean whether the control of the Government in this country might be substituted for the control of the Government of India.

3248. With regard to questions in which time was not a very pressing element, such as those irrigation works which you have described?—I think not; I would rather stand by the Government of India; imperfect and partial as its decisions may sometimes be, I would rather stand by the Government of India than the India Office.

Mr. *Ernest Noel.*

3249. Do I rightly understand your Lordship to make a great distinction between the next two or three years and 10 or 15 years hence, as regards the expenditure on irrigation and canal works in Madras?—I was asked whether I could contemplate an expenditure of two or three millions of money within the next two or three years in Madras, otherwise than in the deltas; I cannot contemplate such a thing, because I do not believe that there are schemes in a sufficient state of maturity to justify the employment of any sum of that sort.

3250. And, therefore, though the schemes are not ready yet, there is no reason why we may not begin them as soon as a proper scheme, which could be showed to pay, was ready?—The schemes are not ready; the schemes would require years to mature. I am not very enthusiastic about their success, but I am of opinion that one or two representative schemes should, without loss of time, be selected and studied to the very bottom.

Mr. *Pease.*

3251. I presume that you intend your main irrigation works to be also means of communication?—Where there is a great and manifest superabundance of water, and where the works themselves are principally in the nature of excavation, there I can contemplate, even in Southern India, the canals being vehicles of navigation as well as of irrigation. You must however consider that in principle the two objects are antagonistic. Irrigation implies depletion or diminution, and navigation requires fullness. Now, how are those two objects to be served at the same time and on all occasions? Only by a vast and superabundant supply of water. In my opinion, expressed in general terms, canals will never be the vehicles of navigation of common traffic in India, south, at any rate, of the Godavery in the interior of the country. I wish that I could entertain a different opinion; but that is my present impression.

3252. Have you gone at all into the relative cost in India of conveying traffic on canals under the most favourable circumstances, and of conveying the same traffic by railway?—No; I have not gone into detail upon the subject, but I think I have a tolerably correct impression on the subject. Canals for the purpose of carrying traffic are of two kinds, salt-water canals and fresh-water canals. The development of the salt-water canal system along the borders of the Madras coasts is a very important question, and ought to be thoroughly studied. I have no doubt that fresh-water canals in deltas may also be very extensively and very profitably used, but in the interior of the country we have no example of a fresh-water navigation canal at all, except the canal which has been recently constructed by the Madras Company. What navigation canals would cost in the interior of the country is a perfect mystery. No one really knows anything at all about it.

3253. Supposing that the question of irrigation were out of view altogether, and that the means of conveyance were what you were looking to, would you have any hesitation in laying out a railway rather than a canal?—Fresh water is such a valuable commodity in the south of India that I cannot imagine that it should ever be the common drudge of commercial traffic. I can hardly imagine such an idea as that of using fresh water in Southern India to the exclusion of irrigation, for the purpose of navigation or traffic. If a paradoxical hypothesis of that kind is put before me, I think I must answer, that I would unquestionably contemplate a railway in preference to a canal. I know what a railway will cost. It will cost a great deal too much, but I know pretty well that it will not exceed a certain amount, whereas I consider that the formation of navigation canals in the interior of Southern India is a chimerical project.

3254. Is it not a fact that in India as in this country a railway would be begun and be made and maintained and worked cheaper than any canal?—That I cannot say. I think that that must certainly depend entirely upon local circumstances. A salt-water canal along the Madras coast can be made much more cheaply than a railway and kept for infinitely less money, and a fresh-water canal in the deltas might be excavated more cheaply than a railway and kept for much less money. I am talking of navigation canals carried over the mountains and slopes and dry

Mr. *Pease*—continued.

dry regions of Southern India in the interior of the country.

Mr. *John Cross.*

3255. With regard to supplying the tanks in Madras from perennial sources of supply, can you give the Committee any information as to the possibility of that?—Tanks are sometimes mere local reservoirs which do not stand in any natural connection or easy connection with the permanent or rather intermittent rivers of the country, for really there are very few of them which are perennial. Such tanks are supplied merely by the local rainfall just as a tank in a house is supplied by the water from the roof. There are many tanks which cannot be connected with a perennial or even an intermittent river without such an amount of expenditure as would not be justified; but there are other tanks which could be brought into connection with perennial or intermittent sources of water supply, either brought *de novo* into connection with them or into improved connection with them. Every individual case should be studied; it should be ascertained whether any particular tank can be brought into connection with a river, and if it can be profitably brought into connection with a river, it should be done. Many tanks only derive their supply from a river after their supply has been poured through a dozen other tanks, and the last one lives upon the remainder of what the other tanks can afford it.

3256. As a general rule you think there is not very much to be done in that way in supplying those tanks, which I think you called famine traps?—Yes, I am of opinion that there are a number of local tanks which could not be profitably repaired, and ought not to be repaired at any considerable expense.

Mr. *Hardcastle.*

3257. You have expressed the opinion that it was chimerical to suppose that fresh water could be used as a common drudge for navigation for the interior of Madras; in speaking thus, was your idea that the canals in question could be used only for navigation and not for purposes of irrigation also?—The question, as I understood it, was put to me in this form: If you had to choose between a fresh-water canal constructed solely for the purpose of navigation, and a railway, which would you prefer? Then I say that I can hardly contemplate the construction of a canal solely for the purposes of navigation in the interior of Madras; but I would go further and I would say that I can hardly contemplate, as at present advised, the creation of canals for the double or combined purpose of navigation and irrigation to any extent in the interior of the country; however that is merely my impression. It may be a prepossession or a prejudice. I earnestly desire to see some scheme thoroughly studied out in the interior of the country in order that we may know the result; and there are schemes before my mind at this moment which I should be happy to see studied.

3258. Is it your view that the use of water for the purposes of navigation would be a waste of water; does navigation consume the water except so far as evaporation from the canal goes?—No, it does not; but the two interests or objects would quarrel with each other; there would not be enough water for both; the water would be wanted for navigation at the time it

Mr. *Hardcastle*—continued.

was wanted for irrigation; it would all be run off for irrigation, which is the principal object of course, and the boats would be left upon the bank. I wish I could believe that the two objects could be united. There are one or two projects which would solve the question; but they must be studied to the very bottom. Then I guarded myself; I said, to the south of the Godavery, perhaps I might have said to the south of the Khistna. If there is any possibility of navigation canals in the interior, the water must be drawn from the Godavery and the Khistna, but I doubt even whether it could be profitably obtained from them. If you make a canal for the purpose of irrigation and navigation together, you incur very serious obligations with regard to the direction of the canal and the expenditure on its works. An irrigation canal is a very different thing in gauge, in slope, in depth, in cost, in everything from a navigation canal. When you contemplate navigation, you incur immense sources of expenditure which do not exist upon an irrigation canal.

3259. With regard to the employment of natives as engineers, your Lordship said that you would wish to see a native in the position of a district engineer, or adlatus to the Collector, which as I understand, is a high position; are you of opinion that there are at the present time any native engineers who would be capable of fulfilling the duties of that office?—No, I should doubt it; they would have to be educated for it.

3260. Have you any opinion as to the higher class of natives having any aptitude or taste for that employment; I ask that question because Sir William Muir said before us the other day, "I think it is rather the case that engineering studies and employments are not popular among the natives; the higher employment on the public works is not a branch of employment which they naturally take to;" have you any experience of the natives which would enable you to give an opinion upon that view as expressed by Sir William Muir?—It is a common saying that the natives of India are more adapted for thought-work or desk-work than for field-work, that their ability is more of a speculative than of a practical character; but I can hardly doubt that there must be latent energies and abilities in the native character commensurate for such employments. We know that the natives, in former times, under native sovereigns, carried out works of a very aspiring and daring character; and why should they not do the same thing in modern times under our rule?

3261. The native sovereigns under whom they lived have deteriorated, and perhaps engineers may have deteriorated too; but the object of the Thomason College has been, I understand from Sir William Muir's evidence, to draw out such a body of natives, although it has not succeeded as yet in producing a single engineer of any eminence; therefore, may I ask, whether it is rather a hope than an expectation on your Lordship's part that education would develope that latent energy and ability?—It is a little more than a hope; I think it is an expectation; but it is not a certainty.

Sir *George Campbell.*

3262. Does it not occur to your Lordship that our system of education has been calculated to educate men of the pen much more than men of

Right Hon. Lord *Napier and Ettrick.*

11 July 1878.

Sir *George Campbell*—continued.

robust physical qualities?—Certainly, our education has chiefly been turned to that object. We have not given the natives an education to form them to practical duty, and we have not given the opportunity of exerting the practical faculty. And we have not given them in a sufficient measure, the power of strengthening their moral faculties, because people will not be trustworthy unless you give them trust.

Mr. *Fawcett.*

3263. I understand your Lordship's opinion about the employment of natives to be this, that you think from the past great engineering works which were carried out by natives, works which compare in magnitude, and importance, and success with any that have been carried out by the English, they must have a latent engineering ability which would again show itself if they had reasonable opportunities for its exercise?—I may be forgiven, perhaps, if I am inclined to dispute the premises. I do not think that the works carried out by the natives can be compared with the works carried out by the English, but I think they were sufficiently great to prove that there must be a latent constructive faculty in the race.

3264. Referring to Southern India, has there been any greater engineering work than the Cauvery?—The native works are of a very simple character; they are most respectable works in their result, their object and their number, but they are of a very simple and rude character.

3265. Official documents, I think, the Minister's report from Madras which was published during the time that you were Governor, show that the Cauvery annicut is supposed to be 1,600 years old, and is in a state of perfect preservation at the present time, and is likely to last, it appears, almost for ever; and therefore, although the works may appear to us to be simple, they bear the mark of the greatest possible success which an engineering work can achieve; and that is that they are simple, but that they answer their purpose?—They answer their purpose. The Cauvery is a most respectable river, and the grand annicut is a venerable fabric; but it is after all a rough pile of stones placed where it ought to be placed, and I fancy it has been a good deal modified from time to time; but the natives had no idea of constructing regulation works of a complex character; I believe, too, that they had no notion of constructing a lock.

3266. But is it not rather the case, from your experience, that the people in the country itself in which they live obtain a knowledge of climatic conditions, which people who are imported never do; for instance, it is constantly said that the rudest and worst guide in the Alps obtains a knowledge of snow which never can be acquired by an English traveller, however skilful he may be?—I think the application of that would be, that a native will always know more about water than an Englishman.

3267. Not that he necessarily knows, but that he is very likely to know, how to contend with water, and to provide for floods, and to avoid making the mistakes which have been committed by many skilled English engineers; although their work, on the face of it, may appear to be rough, yet it answers its purpose and succeeds?—A native will, I think, employ a number of

Mr. *Fawcett*—continued.

very simple and practical expedients and agencies available to a certain extent for the object which he has at issue; but those native processes cannot for a moment bear comparison with the processes of modern scientific engineering.

3268. Does not this question, which arises upon your evidence and upon the evidence of several other witnesses, lead to this, that there are great engineering works requiring to be carried out in India, but that the finances of the country are in such a condition that they cannot be carried out; and India being an extremely poor country, might it not be possible that if works were constructed by the natives in a ruder and simpler way, although they may not be so good as more expensive and elaborate works, yet if they were cheap they might be carried out, whereas more costly works, carried out by English engineers, would not be able to be constructed at all?—Not now; the native processes have done their work and fulfilled their destiny; the work which is before us now must, in my mind, be done by the highest processes of modern science.

3269. Are there not a great many native works in Madras (certainly the Minister's report shows it) which were constructed by natives, and which were supposed to be at one time in successful operation, but which are now in a state of decay?—There are undoubtedly many such works; in travelling in some parts of the country you see fragments of old walls, of tanks, and dams lying all about, and it produces a very painful impression; but I do not think you will ever see a wall or an annicut, that is a weir, nearly as good or as fine or as substantial as an English work, except it may be some small works of luxury and beauty, such as the reservoirs of palaces and temples.

3270. But, with all due submission, it does not seem to me that that is the question; if an English work, we will say, costs 300,000 *l.*, and you have not got the money to make it with, and a worked carried out on native principles, though much ruder, might still be a very useful work costing, say only 50,000 *l.* for restoring one of those old native works, and you have the money to do it with, is it not better to spend the money that you have, 50,000 *l.*, although you do not get ideal perfection, than to strain after what you cannot pay for, viz., the carrying out of works costing 300,000 *l.*, because you have not got the money to do it with?—Yes, if you can point to any particular work which would answer exactly to that description; but I think, on the whole, if you were to execute an Indian work in the old native manner, you would probably execute a much less reliable work, and, in the long run, a dearer one than the best English work; I do not think that there can be any retrogression to simple primitive expedients.

3271. Then you do not think that some of the most successful irrigation works in India now, have been works which have been carried out on the basis of native works which have been restored?—The basis is good, and they select the place well to serve the purpose, to a certain extent, but modern science extends the utility and consolidates the strength of native work.

3272. Judging from the past, from the most successful irrigation works that have been in operation, having been old native works restored, it rather leads to the conclusion that they instinctively knew where to place the work, and

as

Mr. *Fawcett*—continued.

as there are many native works still in ruins in Madras, which have not been restored, might it not fairly lead to the inference that success would result from restoring those old native works which are still in ruins?—Some of them might be repaired and replaced, undoubtedly; I do not deny it; but what I doubt is, whether they should be repaired and replaced, in a primitive manner by native expedients in any way. However, it is not the least my wish to undervalue ancient native works, or the capabilities of native temperament or genius for great works. I wish; on the contrary, to see them given an opportunity of development.

3273. You suggest two distinct ways in which you think the natives might have a greater opportunity than they have at the present time of obtaining first class employment in the Public Works Department, either by enabling them, or assisting them, to compete at the Civil Engineering College at Cooper's Hill, or appropriating a certain number of appointments to them in India if they prove that they possess the requisite qualifications to discharge the duties of those appointments?—Yes.

3274. With regard to your proposal for a sinking fund, if you associate that proposal with the very decided objection which you express to increased taxation, and if you borrow money and say that you will only borrow it on condition at the same time that you create a sinking fund, it simply diminishes the amount of money you borrow if you are creating a fund with borrowed money?—Undoubtedly it does. It diminishes the amount which would be applicable to public works, and that would be an evil; but is that an evil so great as the evil of increasing the public debt without any conscientious effect to diminish the burden?

3275. I most entirely agree with your Lordship; I was only putting the point, to show that the Government of India in estimating the amount of money which they can properly borrow for public works, should not consider that they are borrowing that money, as they can borrow it at 4 per cent., but that they should consider that they must pay, say 6 per cent. or 7 per cent., in order to constitute, as you propose, a sinking fund?—It is perfectly true, and I go almost as far as this, that I think that public money should be applied to public works in India on the same principle as the Loan Commissioners' money is applied to public works in England; and that it should never be applied for the purpose of public improvements without a provision for the extinction of the capital debt. I almost go as far as that.

3276. Therefore, if you thought that it would be legitimate to increase the charge on the revenue of India by interest on borrowed money to the extent of 240,000 *l.* a year, you would consider that you only had 4,000,000 *l.* to borrow instead of 6,000,000 *l.*?—Yes.

3277. Although you think it desirable to carry out some public works, still there are many public works in India, and you truly estimate the importance of carrying them out, yet you think on the other hand, that increased taxation in India is so serious that, so far as I understand you, you would incur the disadvantage of not carrying out those public works, rather than incur the greater disadvantage of imposing additional taxation in India?—Yes, I have never yet heard of a tax which I would impose for the purpose of carrying out public works. The moment it is brought to the test of a particular measure, and I am asked, would you impose an income tax solely for the purpose of carrying out public works? I say no. Would you aggravate the salt tax for the purpose of carrying out works public solely? I say no. But I am not without a hope that with the preservation of peace, there may be a surplus revenue in India, and that there may be considerable economy in our public establishments.

3278. Therefore we arrive at the important conclusion that the amount which, with your experience, you think can be properly spent on public works from borrowed money depends, after all, upon the financial condition of India?—Yes, it does.

3279. I think your Lordship expressed yourself not favourable to the transfer of the charges for important public works from Imperial to local taxation?—Yes.

3280. Do not you think that, if the scheme which is known as the decentralisation scheme, is carried out to a large extent, there is this danger associated with it, that a great network of local taxation may grow up in India which will not be under the control of the Imperial Government which may not attract so much attention, and yet may be quite as burthensome, or even more burthensome, than an increase of Imperial taxation?—I think there is some such danger, and therefore I think that the imposition of local taxation should be strictly under the control of the Supreme Government. I think, for instance, that local governors will often have some crotchet or other; one will be for hospitals, another will be for public buildings, and another for irrigation, and so on; and each will always be inclined to spend too much money upon his particular hobby. If he cannot get it out of the Imperial Revenue, he will try and get it out of the local revenue, and he might go a great deal too far in some branches of expenditure; and therefore the Supreme Government, which remains cool, and has not got the same crotchets as the local governors, ought to be there to control them. I speak from personal experience and the recollection of my own inclinations.

3281. And that would be a provision that would apply absolutely to local taxation; you would say that it should not be imposed without the consent of the Imperial Government?—No local taxation should be imposed in India without the assent of the Supreme Government and of the Government at home. For instance, some Governor would want to establish, say, elementary schools all over the country, and tax the people and impose a rate for elementary schools if he was enthusiastic in favour of education, and it would be very desirable that his proclivity should be subjected to the criticism of the Supreme Government, and the Secretary of State, and he ought to be restrained.

3282. I understand you that you preferred the old system of employing local Indian military engineers in public works to the present one of having a special college for their education in England, but that you considered the present system, if I understood you aright, as an inevitable evil resulting from the amalgamation scheme?—I do not like to call it an evil.

3283. Perhaps

Right Hon. Lord *Napier and Ettrick.*

11 July 1878.

Right Hon. Lord *Napier and Ettrick.*

11 July 1878.

Mr. *Fawcett*—continued.

3283. Perhaps you would call it a disadvantage?—It is a substitute which will never in my mind completely fulfil the objects of the former institution; but it may be a most excellent and useful establishment.

3284. But you have been putting it to us as being an inevitable consequence of the amalgamation?—It is one of the inevitable consequences of the amalgamation.

Mr. *Childers.*

3285. In the opinion which you have expressed about a sinking fund, you speak from experience as a Public Works Loan Commissioner yourself, do you not?—I have been connected with the Public Works Loan Commission, which has led me to think of the very great necessity of attaching some method of extinguishing capital to loans; but I have also reflected upon the subject in connection with the conduct of economical governments everywhere, and even extravagant governments.

3286. And you would wish to apply, as nearly as possible to public works in India constructed by loan, the very wise principles upon which the Public Works Loan system was founded here?—I would; I almost go so far as to say that I wish that no public works of any kind in India were undertaken without a provision for the extinction of the capital debt, for I feel convinced that such a measure must be embraced if we are to go into speculative enterprises, such as great irrigation works other than the delta works.

3287. Would you carry that view as far as this, that you would wish to see all great public works in India, which were to be constructed by loan, as carefully scrutinised and come as much under the eye of the public as great public works do in this country?—I think they do at the present time; I think that the scrutiny exerted over schemes for public works in India is certainly as stringent as it is in this country.

3288. That is the case so far as official analysis and investigation go; but is it not the case that, so far as the public is concerned, very little is known of those schemes?—Very little is known of those schemes, but I would ask whether you think that public criticism is of any use in restraining extravagant works anywhere?

3289. Would it be in accordance with your judgment that if all public works of this kind were the subject of a distinct legislative Act by the Council of the Governor General, some additional criticism might be gained?—To this extent, that when the local government and the Supreme Government are about to give their sanction to a loan work, if they knew that they were to pay

Mr. *Childers*—continued.

7 per cent. for the money instead of 4 per cent., I think that that would sharpen their inspection still further; but I think that the machinery of criticism is as elaborate as possible.

3290. Is it the case that outside strictly official circles, anything is known of schemes of that kind?—There is a good deal of discussion in the press about irrigation works and public buildings and railways. I do not suppose that it is really useful or very useful, but I venture to ask again what public criticism is of any use anywhere in restraining extravagance?

3291. Would it be, in your opinion, desirable that before any such works are finally approved, the sanction of the Secretary of State should be obtained?—The sanction of the Secretary of State is, I think, always obtained; at least my impression is, that it is always obtained.

3292. Is that so in the case of all works which can be charged upon loan funds?—That is my impression, but Sir George Campbell could inform me if I am wrong.

3293. Both as to works under local superintendence and under Imperial superintendence?—All works of every description executed from loan funds, and really all important works executed from current revenue are, I think, forwarded to the India Office by the Government of India, and subjected not only to general sanction, but even to professional inspection and sanction.

3294. If that be so, if that is in practice the universal rule, you will be satisfied with the extent of that inspection?—I am really satisfied, so far as I know, with the machinery of criticism, inquiry, and sanction, at the present moment, as it stands. It will be defeated; no human contrivance can protect you against deception and disappointment, but I do not know that it could be rendered more stringent.

3295. You think that, provided each individual work which is to be charged upon the loan fund has to be approved by the Secretary of State, under the present routine, all that can be done will be done in the way of criticism and inspection?—I approve of the inquiry and sanction by the Secretary of State here; I think it is right, but I doubt whether it is really generally operative. I think that the inquiry exerted at Calcutta by the Secretariate for the Public Works Department, with the assistance of the consulting engineers for irrigation and railways, ought to be so stringent and so complete as to defeat subordinate error or subordinate interestedness as far as is possible.

3296. And that is at present as complete as you wish?—It is as complete as I think it can be.

Thursday, 18*th July* 1878.

MEMBERS PRESENT:

Mr. Agnew.	Mr. Hardcastle.
Mr. Ashbury.	Sir Joseph M'Kenna.
Sir George Campbell.	Mr. Ernest Noel.
Mr. Fawcett.	Mr. Onslow.
Lord George Hamilton.	Mr. Pease.

LORD GEORGE HAMILTON, IN THE CHAIR.

Colonel GEORGE CHESNEY, R.E., called in; and Examined.

Chairman.

3297. I BELIEVE you are at present the head of the Royal Engineering College at Cooper's Hill?—Yes.

3298. As your previous experience in the Public Works Department has been somewhat varied, perhaps you will state to the Committee the different capacities in which you have served?—From 1850 to 1856 I was employed as executive engineer in various capacities; from 1856 until 1861 in connection with the Roorkee and Calcutta Engineering Colleges; and from 1861 I had charge of the accounts of the Public Works Department, first as inspector general, and afterwards as accountant general until 1870, when I was called home to take charge of the New Civil Engineering College at Cooper's Hill, where I have remained ever since.

Sir *George Campbell.*

3299. Have you ever been in the Executive of the Irrigation Department?—I had charge of the canals of Peshawur for a short time; the irrigation there is on a very small scale.

Chairman.

3300. You have therefore made the policy of constructing public works in India somewhat a special study?—I have had occasion to do so.

3301. You are acquainted with the evidence which has been given by General Dickens, Colonel Crofton, and other officers connected with the Public Works Department; do you generally agree with the purport of their evidence?—Generally.

3302. There are one or two points upon which you wish to supplement the evidence of General Dickens, and I believe one of those points is the question of accounts; have you seen the new form of account proposed by the India Office?—I have seen it; and I would wish to say that I consider the introduction of that form of account would be a most important improvement in the finance of the Public Works Department.

3303. Do you think there would be any practical difficulty in getting sufficiently accurate returns?—I apprehend no difficulty whatever. The Public Works Accounts are kept now in extreme detail, and with perfect accuracy and regularity. The question is only on the altering of the form, and I apprehend that there would be no difficulty about that whatever.

Chairman—continued.

3304. The principle upon which this new form of accounts is based is the same as that upon which the forecasts of the Public Works Expenditure are estimated, by which the Public Works Department calculate that, notwithstanding the increase on capital expenditure, there will be an actual decrease between the receipts and the working expenses and the interest on the sums borrowed?—I think it is reasonable to expect that there will be a decrease in the charge as time goes on.

3305. If it is reasonable to expect that the calculations and estimates of the Public Works Department will be realised, do not you think it is only right that the form of the account presented to Parliament should be such as will test whether or not those calculations are correct?—I think that is most important.

3306. And, looking at it from a financial point of view, I assume that Parliament will have a much greater control over the expenditure when it is evident, from one sheet of accounts, whether or not the Public Works Expenditure in India does entail an additional charge upon the revenues, or not?—I think it is absolutely necessary to do what is now proposed, namely, to divide your capital expenditure from the accounts of the revenue expenditure of the year, if you are to know the financial results of the Public Works. For that reason I consider this change absolutely necessary.

3307, At present the public are not aware, or at least they cannot ascertain, without a further examination of the accounts, what the indebtedness of the Government as to guaranteed railways, and what the actual annual loss of the working of that system is?—I think the condition of the Guaranteed Railway Account is much more clearly shown at present than that of the State Public Works, because the Guaranteed Railway Capital Account has always been kept out of the financial accounts of the year.

3308. In fact any capital expenditure of the guaranteed railway has hitherto always been excluded from the ordinary account; but now that the

Colonel *G. Chesney*, R.E.
18 July 1878.

Colonel *G. Chesney*, R.E.

18 July 1878.

Chairman—continued.

the State undertake to do the work of the guaranteed railways, the capital which they expend has hitherto been brought into the ordinary revenue account?—Yes.

3309. I believe you are in favour of a moderate and careful prosecution of Public Works in India?—Yes.

3310. Have you any notion of what the average amount which, from all sources, has been spent during the past few years?—The expenditure on Public Works, if you exclude from that title barracks and public buildings, which are only public works in the sense of not being private works, the expenditure on Public Works of all sorts during the past 11 years has been on the average about 8,000,000 *l.* sterling a year, if you include, as you must do, I think, the expenditure on guaranteed railways.

Sir *George Campbell.*

3311. And the expenditure on repairs?—No, excluding repairs; I mean the expenditure on new works.

Chairman.

3312. That is to say, there is an annual increase to the capital account, we will say, of about 8,000,000 *l.*?—It has not all been paid from capital; part has been defrayed out of revenue; but if you include all the roads and irrigation works and railways; with their establishment and plant, which have been constructed during the past 11 years, the total expenditure is 88,000,000 *l.*, or as nearly as possible 8,000,000 *l.* a year.

3313. You mentioned roads; they would not come under the head of Public Works Extraordinary, would they?—They are not reproductive works; but I have included the expenditure upon roads from Imperial funds on that account; they form, I should add, a very small part of the whole expenditure.

Sir *George Campbell.*

3314. You said Imperial funds; do you exclude funds expended by local governments?—I exclude them entirely; the Public Works Accounts do not show the expenditure from local funds.

3315. Do you exclude roads made by the local Governments from the annual assignments for works?—No, I exclude all those which fall into the annual account.

Chairman.

3316. The account which is presented from the latest forecasts of the Indian Government propose to devote annually to the Public Works Extraordinary only four millions, therefore there has been a decrease latterly in the annual amount devoted to Public Works Extraordinary?—There has been a decrease in this sense, that there has been a great diminution in the capital expenditure on the guaranteed lines; but the expenditure from direct State agency has been rather increased in late years than diminished.

3317. Taking both together, the actual amount of capital is diminished?—Taking both together, a considerable reduction is proposed upon the expenditure of previous years.

3318. And the public generally have only had their attention directed to the outlay upon Public Works Extraordinary since the State have undertaken to construct those works themselves, and in consequence the total amount which they annually devote is shown in the Revenue Accounts; it is clear, therefore, that in the preceding year, owing to the particular form of account in which the guaranteed railways annually undertaken and constructed were included, the public were not aware of the amount that was annually expended upon Public Works Extraordinary?—No doubt they got a generally incorrect view of the case.

Chairman—continued.

3319. And the present form of account will place before the public generally in a much clearer way what the actual policy is which the Government propose to pursue?—I think so.

3320. We have had it in evidence from several witnesses that they think it would be advisable to establish a system of terminable annuities or certain sinking funds, as regards the sums borrowed for Public Works Extraordinary; have you ever considered this point?—I have, and I will venture to say that I think it is of extreme importance that some sort of sinking fund should be established in connection with Public Works Expenditure, because in that way you would anticipate the objection that you are placing by the prosecution of public works a burden on the finances of the country greater than they will be able eventually to bear; I therefore conceive that it would be very desirable to establish a system of annuities under which the charges incurred should be defrayed, say within 50 years, and that the sinking fund applied for this purpose should be applied annually from revenue only, and not from capital; that is to say, supposing it were determined to borrow five millions for public works in any year, it would be necessary to contribute about three-quarters of a million sterling in the form of a capital appropriation, which would constitute a sinking fund to pay off that five millions in 50 years. It is proposed, I believe, to increase the revenues of India by about a million and a half sterling a year, and to consider that a sort of famine reserve fund; and it is to be expended upon public works, the result of which would be, it would be assumed, such as eventually to recoup the expenditure. I would venture to think that it would be clearly a safe and desirable part of such a scheme to apply a part of that increased revenue to the purposes of a sinking fund. Then, even if the works do not return the revenue which is expected from them, still at the end of the time for which the annuities ran, say for 40 or 50 years, that debt would have disappeared. In other words, you would have paid for it out of the revenues by increased taxation.

3321. By increasing the taxation that has already been put on?—Not by increasing the taxation now, but by the revenues which you are already in possession of.

3322. You think that by some such system of terminable annuities you would insure a *bonâ fide* application of this extra million and a half to the purposes for which it is nominally raised?—I think that in such a way you avoid putting off the evil day when you are brought face to face with the financial results of your Public Works Expenditure. If, in consequence of the necessity for putting aside this sum, you find that the charge upon the revenues is greater than you can bear, or that the pressure becomes extreme and undesirable, you have at once evidence that you are pushing the public works policy too far. Of course I am quite aware that there is no philosopher's stone in a sinking fund; the money simply has to be provided

Chairman—continued.

vided in some way or other. You do not get more money by establishing a sinking fund; you simply apply part of the savings of the year to meet your expenditure, instead of obtaining the whole of your money by loan. I would further venture to say that I think it would be very desirable that there should be some specific authority, some Trust Commissioner, in charge of the sinking fund money, apart from the ordinary financial officers of the Government. It has occurred to me that you would have such a body in the Currency Commissioners who now hold very considerable quantities of Government securities, who are accustomed, in fact, to deal with Government securities. Of course when we talk about creating annuities, we know that no annuities really are created. In England when money is borrowed for annuities, I believe the Treasury always employ the agency of the Savings Bank Commissioners, and in the same way it appears to me that the agency of the Currency Commissioners in India might be employed to create artificial annuities, the surplus interest on which, over and above the ordinary interest on interminable securities, would accumulate in the possession of those Commissioners, who would gradually purchase ordinary stock and eventually cancel the debt.

3323. That just brings us to another point; at present if any locality or municipality wish to construct a local work of public utility, they invariably have to obtain the money from the Government, who simply take it out of their cash balances; have you considered whether any system at all analogous to that of the Public Works Loan Commissioners, as in force in this country, could be established in India?—I think it is quite possible to do so, and it would be extremely desirable.

3324. If a body was established such as you suggest, by either the Currency Commissioners or some other financial authority, they might advance sums to local authorities and municipalities as they were wanted, upon the same principle as is done here, and they might also have, might they not, the charge and control of the funds which you propose to devote to Public Works Extraordinary, and wish to be raised by terminable annuities?—The same agency might do for both purposes; I am not prepared to say that I think it would necessarily be desirable to have the same trust for the two duties, which are to a certain extent different in kind.

3325. But you still think it would be advisable, whatever the agency might be through which such a plan could be put into practice, to separate that agency from the ordinary financial authorities of the Treasury?—I do, most distinctly.

3326. Because at present, no doubt, the question of cash balances is a very complex one, and it is therefore difficult for anyone who is not an expert exactly, to know what funds are at the disposal of the Indian Government, not only for Public Works, but also for other purposes?—It is because the Indian Government is in a very peculiar situation, as being the custodian of all the public moneys generally; and both Imperial funds and local funds being mixed up together as they are in the general Treasury, it becomes extremely difficult to keep them distinct, and therefore the creation of a separate trust for dealing with local loans is, I think, a financial reform which is very much called for.

Chairman—continued.

3327. And by some such proposal as you suggest, there would be a separation of the ways and means by which the Government propose to meet the ordinary expenditure of the year from the ways and means, by which they would provide for Public Works Extraordinary, and local works of public utility?—There would be a separation in the account, but the cash balances would still, I apprehend, have to contain all the Government money from whatever source it came.

3328. But the fact of the separation in the account would make it more clear to the general public what the actual state of indebtedness of the Indian Government was?—It would; but the public works officers must in every case draw their funds through their district treasuries, and those district treasuries must be the recipients of the public monies from whatever source accruing. I do not think you could have separate treasuries in any way, or separate cash funds, although you may have separate accounts.

3329. In fact, that would be hardly possible, on account of the enormous number of treasuries which there are in India?—It would involve a great multiplication to do so of treasuries upon the existing number of treasuries to do so.

3330. And would consequently necessitate an increase to the amount which is now considered necessary to meet the disbursements of the Government for the year?—It would prevent any economy in the matter of cash balances certainly, and lead to a great increase of expense, I think.

3331. We have had it very clearly laid down before us that the Government of India have no difficulty in raising funds for the prosecution of Public Works Extraordinary, but there seems to be considerable difficulty in the way of localities carrying out public works, which might be of use in their different districts; have you ever considered whether it would be possible for localities to carry out public works by establishing any system approaching to or at all like our system of municipalities and local authorities?—It has appeared to me very desirable at any rate to make some attempt in that direction. At present, under our highly centralised system of government, the villages contribute the money for public works in the form of taxation, which comes back to them in the form of the Public Works Department, with its apparatus of officials, and its highly centralised system; and I cannot help thinking that it might be possible, at any rate for the smaller class of irrigation works, to utilise and, where we have destroyed it, if possible to re-create the system of village governments for the conservation of their own irrigation works.

3332. Sir George Campbell, a Member of the Committee, gave evidence at some length upon this point; do you agree with him?—I concur generally with what Sir George Campbell has said upon that point.

3333. What security could they give, supposing the money was advanced by the Government to them?—I apprehend that in the case of the village communities, the Government has the very best of all securities, that is the land.

3334. But it would be necessary, would it not, if any monies were advanced to the local authorities,

Colonel *G. Chesney*, R.E.

18 July 1878.

Colonel *G. Chesney*, R.E.

18 July 1878.

Chairman—continued.

rities, that the Government should give those local authorities the power of raising a tax or a rate in some?—The people would require in the case that I am speaking of, first of all, a small irrigation work, say, for instance, a tank which waters one village. The idea that I had in view was something of this sort, that there should be by legislative enactment power given to the Government to make over the charge of that work to the village, and to hold the village responsible for its proper conservation. That in the case of large works, say a large tank which irrigates the land of several villages, in the same way, a municipality should be formed *ad hoc* for that particular irrigation work. That the Government should contribute the proper supervision which is supplied now, and that the people of the municipality should be bound to raise a sufficient amount to supply the labour and to supply also the different materials for keeping that work in good repair.

3335. Then the local authority must have some control over the construction and the nature of the work?—That would follow as a matter of course, and probably they would take then the supervision.

3336. I suppose we may assume that if any locality had to bear even an increased land cess, in consequence of some work of public utility which had been constructed in the neighbourhood, as they would be able to trace at once the application of the increased taxation to their own benefit, they would be disposed to bear this increased taxation more readily than they would otherwise be likely to do?—I think it is reasonable to expect so; and there would be this advantage, as it seems to me, in the system of localising the Public Works Administration, that the burden would fall very differently in different localities. It seems to me that one of the great evils of our present system of finance and taxation is the oppressive uniformity of taxation in India; and we have already lately so far removed that opprobrium a little by having a power now taken for one cess in Bengal and another and a different one in the North-west Provinces, and so on. And if we could go still further, and have a separate assessment made for still smaller communities than a whole province, the money of which should go directly to be applied by the delegates of those communities to their own purposes, they would become, I think, much more reconciled to such taxation than they often are at present.

3337. Would you propose that any sums advanced in the manner suggested by you to the localities should be outside what is known as Public Works Extraordinary Expenditure?—Certainly.

3338. They would be in the nature more of advances, would they not?—More what is called at present Local Fund Expenditure. I should observe that there is a good deal now of Local Fund Expenditure, that is to say, expenditure raised in the districts, and which is understood to be only available for expenditure in the districts in which it is raised; but I believe that the rule is carried out with some considerable laxity, and naturally the people have no voice in the disposal of the money; it is, I believe, entirely expended at the discretion of the Government officials of the district.

3339. Your suggestion would be to give the locality a certain voice as to the nature of the work which is to be constructed in their neighbourhood?—That would have to be very fully considered, because the Government might have the strongest views of the necessity of maintaining a work, and they might be obliged to enforce the maintenance of a work, whether the people liked it or not.

3340. Still within certain limits that might be so?—Yes; irrigation works are works which the people have the keenest interest in preserving themselves.

3341. Adverting to another subject, we have had a good deal of evidence as to the supply of officers of the Public Works Department; you, of course, must have very carefully considered this question as the head of Cooper's Hill College, and perhaps you will be kind enough to give the Committee your views upon this point?—I would first observe that, judging from the questions put by honourable Members to other witnesses, there is some misapprehension, I think, as to the objects for which Cooper's Hill was established. It seems to be supposed that Cooper's Hill has stepped in to supply the place which otherwise might have been taken by native engineers. Now, when Cooper's Hill was established, there was no question about increasing or raising a staff of native engineers; the question was simply given the demand for a certain number of European engineers, who by the nature of the case were assumed to be necessary, what is the best way of supplying those European engineers? For some years the Government advertised for so many engineers as were required every year; to be chosen by a competitive examination. The number advertised for for many years was 40 a year; but the candidates that came forward were usually very much less than 40, and of those candidates sometimes only three or four would be found eligible for the public service; that method of supplying the service, therefore, fell through. Then the Government resorted to the plan of calling for civil engineers of standing, and choosing them simply with reference to their testimonials, and in the year 1867-68, 80 civil engineers, of ages varying from 45 to 25 were selected and sent out in that way. It was found that this was an unsatisfactory way of filling up the public service, because the young officers in the service were superseded by older men coming in; further, the men appointed at mature age became worn out and too old for their work before they became eligible for pensions; and therefore it was determined that in future the supply should be mainly from the bottom of the service, that is to say, only young men should be selected, and then it was considered desirable that the Government should take the education of the engineers into its own hands, as it was found that they were not forthcoming in an educated form elsewhere. That is the history of the establishment of Cooper's Hill. Then it has been said that Cooper's Hill has in some way interfered with the interests of the engineering college established in India, what is known as the Thomason College at Roorkee. It seems to be assumed that the Thomason College at Roorkee is intended for the training of native engineers, who have now been, so to speak, cut out of their position by the establishment of Cooper's Hill. What I wish to bring before the

Chairman—continued.

the Committee is the fact that the Thomason College at Roorkee, at least the upper or engineering branch of it, is essentially also a college for European engineers; it is a question, therefore, between one European college and between another European college. The engineering department of the college at Roorkee consists almost entirely of young Englishmen who have either been educated in India or have gone out to India for the purpose of getting into the public service through the college. They receive a gratuitous education, so that the whole cost of the establishment at Roorkee is defrayed by the State. When Roorkee was first established, young engineers were wanted wherever they could be found, and this engineering department of Roorkee College was established with a view to supplying young European engineers, and as they could only be got on those terms, the practice was established of giving them a purely gratuitous education; but now that you can get the pick of the young men of England almost, for your engineer service, and who are ready to pay for their own education, there appear absolutely no grounds in the way of expediency or right for any longer considering that the young men trained at Roorkee have a lien on the public service.

3342. What are the conditions of admission into Roorkee?—The conditions for admission into Roorkee are passing a very moderate educational test. Then they join the college for a course lasting a year and a half; and at the end of that time, until quite lately, everybody who qualified according to the test laid down was appointed to the public service. Besides the European and East Indian students at Roorkee, there are also, however, some native students, who enter with scholarships. For many years six scholarships have been offered to the whole of the native students of the different schools in the North West Provinces, scholarships of the value of 60*l.* a year; but for many years only one or two candidates came forward to accept those scholarships. Of late years the number of native candidates has increased, and of late years, also, in lieu of everybody at Roorkee receiving an appointment when qualified for the public service, a sort of limited competition has been introduced amongst the students, and it has been found that in this limited competition the European students have cut out the natives. In the last return that I have seen from Roorkee, there were only, I think, 14 students passed through the first class, and eight appointments were given for competition amongst those 14. Of those 14 students, one native stood sixth, that is to say, seven of the successful competitors were Europeans or East Indian, and one was a native.

Mr. *Onslow.*

3343. How many natives went up for examination?—Of the 14 in the senior class only one was a native, and he was sixth. In the junior class, out of 21 students, the 6th, the 13th, the 15th, the 16th, the 17th, and the 20th, were natives. So that practically the result has been that the European or East Indian students have taken all the successful places.

Chairman.

3344. Of what class are the European students; are they the sons of Indian officers?—Some are the sons of Indian officers who have retired and

Chairman—continued.

Colonel *G. Chesney*, R.E.

18 July 1878.

are living in the Himalayas; some are the sons of old warrant officers who have spent their lives in the country, some are the sons of East Indians in the public service, and a few are simply young men who have gone out from England with a view of entering the service through Roorkee.

3345. Having passed through Roorkee, I suppose they enter the service of the Public Works Department on the same conditions as the students from Cooper's Hill College?—No, they do not. Until the establishment of Cooper's Hill, all appointments were made in the third-grade class of assistant engineers. When Cooper's Hill was established, in consequence of the course being made so very much longer, being a full three years' course in lieu of one of a year and a half, and in consequence of the considerable charge made for the education, it was thought desirable to increase the attractions, and therefore to pass out all successful candidates as second-class assistant engineers. So that a Cooper's Hill man enters the service one grade higher than a Roorkee man. And now, I believe, the passed students from Roorkee are required to pass a certain examination as engineer apprentices, on a still smaller salary, before being appointed to the 3rd grade. There is no limit, I believe, upon the time in which a Roorkee man can be promoted from the 3rd to the 2nd grade. He can be promoted, I think, under the rules of the service, to the 2nd grade; but as a matter of fact he is not promoted for a year or two, or even longer.

Sir *George Campbell.*

3346. Could you mention the salaries of the two grades; the 2nd and 3rd grades?—The salary of the 2nd grade is 350 rupees a month; and of the 3rd grade, 250 rupees.

Mr. *Onslow.*

3347. You have omitted one important class at Roorkee, those young officers who hold also Her Majesty's commission?—The class of young officers, I think, has almost ceased.

3348. Since when?—Within the last three or four years. Previous to that the Engineer Department at Roorkee contained some young officers as well as young men who were not in the army.

Sir *George Campbell.*

3349. Were those young officers of the Staff Corps?—As it stands now, I believe an officer enters the Staff Corps as a probationer when he goes to Roorkee; but I am not certain. I think now the officer class is almost extinct.

Chairman.

3350. Have you any difficulty in getting sufficient candidates for the Cooper's Hill College?—None whatever; the competition is quite severe enough.

3351. I suppose that this Roorkee College, in fact, affords an easier means of entrance into the Public Works Department for Europeans than the Cooper's Hill College?—Unquestionably.

3352. I suppose we may assume that any man who was likely to pass into the Cooper's Hill College would not be likely to go to Roorkee?—It is very difficult to say, because Roorkee offers a kind of certainty of getting into a certain

Colonel G. Chesney, R.E.

18 July 1878.

Chairman—continued.

position, whereas the getting into Cooper's Hill is very much a matter of uncertainty, as the competition for admission is severe; but there is no competition for admission into Roorkee at all; it is simply a pass examination. There is now a limited competition to secure appointments on passing out from it.

Mr. *Ernest Noel.*

3353. Roorkee is still gratuitous, is it not?—Yes, the education is entirely gratuitous, and the native students receive a stipend in addition.

Sir *George Campbell.*

3354. Does that apply to all native students?—Yes, to all native students.

Mr. *Fawcett.*

3355. I thought you said there were six scholarships?—I do not think that there are ever more than six students in that department.

3356. There appear not to be a sufficient number to fill the six scholarships up, but if there were more than six, there is no saying that they would receive a stipend?—I think no one has ever gone in without a scholarship yet, so far as I am aware.

Chairman.

3357. Then as regards the supply to the Public Works Department, it is at present somewhat in excess of the demand, and in consequence the promotion in the lower grade has been excessively slow; is not that the case?—I do not think that the promotion is excessively slow. Several that I could name who left the college three years ago, have already got a step of promotion.

3358. Are not the upper grades of the Public Works Department therefore overstocked?—The department is now in a very abnormal and exceptional state. It has been largely recruited, as I mentioned, by men in middle life who have come in from the railways, and from other ways; not at the bottom of the ladder. Many of these men want to retire, and are old enough to make it desirable they should do so, but they have not served long enough to secure a pension. They are holding on, I suppose, in the hope of getting better terms of some sort, and therefore retirements have not yet begun to take place from the department. It has undergone a very rapid expansion, and a very large number of members of the service are nearly all of the same standing. The department is only practically about 20 years old as regards the civil element, and therefore, strictly speaking, no one yet is qualified for a pension. Therefore in that sense there is a block; but as soon as a normal condition is arrived at, I do not think that the present supply will be at all in excess of the vacancies occurring.

3359. Up to very recently, there were several different sources of supply for the Public Works Department, for, in addition to the officer who had received a special training in the Engineering Corps, there were a considerable number, I believe, of the Staff Corps officers employed, and also a certain number of Royal Engineers and civilians?—The Royal Engineers have a fixed establishment for the Indian service which furnishes about 300 officers available for the Public Works Department. The total

Chairman—continued.

strength of the Public Works Department at present is 1,200, consequently 900 members have to be supplied from some other source. I believe there are about 100 other military officers in the department who entered in the old days, when the tests were extremely light and carelessly applied. The remainder of the department is entirely civil engineers, some being natives, but the great majority Europeans.

3360. Then little by little, I suppose, the civilian element, using that word in the Indian sense, and the staff corps element will disappear, and the only officers who will enter into the Public Works Department will be those who have passed through some engineering college?—It will consist eventually probably of Royal Engineers, and civil engineers trained at different colleges.

3361. The Royal Engineers are employed because, as they are stationed in India, it has been found a good opportunity to utilise their talent?—I would rather say that the corps has been very largely augmented for the Indian service, and especially with a view to the Public Works Department. There is no demand for this number of military officers in a military capacity; but the Indian Government have very strongly urged that a considerable portion of the staff should be military engineers, and the corps has been increased in consequence.

3362. Are those officers, as a rule, acquainted with the vernacular languages?—Every officer in the department is required to pass in the vernacular before promotion; every officer, whether Royal Engineer or civil engineer, is required to pass in the languages before he can reach promotion as an executive engineer.

Sir *George Campbell.*

3363. But he may be appointed to the department, may he not, with a complete ignorance of the language?—Yes.

Chairman.

3364. But not in an executive capacity?—He can be employed as an assistant engineer without any knowledge of the language, and of course as long as the practice was in force of sending out engineers of mature age, the language test had to be entirely placed on one side. Many officers were sent out as executive engineers, and some in a higher capacity, who never had been in India before, and they of course were not required to pass the language test.

3365. If any officer can be employed in the Public Works Department without any knowledge of the vernacular in the capacity of assistant engineer, can he be promoted afterwards to a higher grade?—He cannot be promoted even to the grade of first-class assistant till he has passed what is called technically the lower standard; and he cannot be promoted to executive engineer, the next step in the department, till he has passed the higher standard.

3366. Then an officer of the Royal Engineers, who was stationed in India, would not, as a matter of course, be transferred to the Public Works Department, but it would be necessary for him, before he could be admitted to that department, that he should pass some test in the vernacular?—It would be necessary that he should pass the test before he can get his first step of promotion.

Practically,

Chairman—continued.

Practically, the officers of the Royal Engineers all go out as young men on leaving the School of Engineering at Chatham; and going out young, they enter the department at the bottom, like the Civil Engineers, and they have to pass the same examination, and rise in the same way.

3367. What is their length of service in India; is it the same as that of the Line?—A rule has been put forward that they should be relieved at the end of seven years; but practically it is not likely to be carried out, because, in the first place, considerably more than one-half of the young officers of the corps are serving in India, and there is no means therefore of relieving them. There are not enough officers to come out to relieve them. In the next place, the Indian Government would object to their experienced officers being taken away home, and inexperienced officers being sent out in their place, and therefore I think I may safely say that that rule is a dead letter, and will remain a dead letter.

Mr. *Onslow.*

3368. That is so far as the Indian Government is concerned, but cannot the officers themselves claim a discharge at the end of seven years?—They can claim to be relieved at the end of seven years, but as a matter of fact they do not claim to be relieved; they are only too glad to stay in India; of course there are exceptional cases in which they do claim the relief.

Chairman.

3369. Then we cannot account for 300 of the Public Works Department; as regards the remaining 900, what number would it be necessary annually to send out from England, from Cooper's Hill College, in order to keep up that establishment; at present they send out, I believe, 50?—The number received last year into Cooper's Hill was 45, but it seldom happens that the whole number entering the College pass out at the end of the three years, for they drop off from various causes. I think it may be assumed that 10 per cent. at least of the number entering will fail to pass out, and consequently that a supply of 45 students will give about 40 officers for the public service. This year we receive only 35 students, who will give probably about 31 or 32 eligible candidates. That number will scarcely be sufficient to keep the department going when it reaches a normal state. The estimate of the Government of India is, I believe, that from 40 to 45 students will be required annually to keep the department fully supplied.

3370. How many students annually pass out of the college in India?—Roorkee supplies eight students a year, and there is what is called an engineering college in Calcutta, but it really does not deserve the name; it is an institution which has been starved from the very first, and which really gives no proper engineering training. I speak with great confidence upon that point, because I was at the head of it for two years, and we had absolutely no means or appliances for teaching deserving the name; but what means we had have been very much reduced latterly, and, therefore, although it still goes on, it cannot be depended upon to supply any engineers at all for the higher grades of the service. Roorkee, therefore, remains the only source at present, besides Cooper's Hill.

3371. Then there is a college in Madras also, is there not?—Yes, but that also is kept upon the most attenuated scale, and is practically employed in training subordinates only.

3372. Still, I suppose, a certain number must pass out of both those colleges, however indifferent may be the education?—They are fulfilling an extremely useful function in supplying native subordinates for the department, who have a much less complete training, but who are quite as necessary in their way as the more highly trained engineers.

3373. And those officers you exclude from the supply which annually feeds the Public Works Department?—They form an entirely separate branch of the department.

3374. Is there a considerable difference in the education given in Calcutta and Madras engineering colleges as compared with Roorkee?—The Roorkee establishment is on a very insufficient scale for giving a thorough education; but is is on a much more liberal scale than the establishment at Madras, and still more so than that of Calcutta, where the whole engineering staff consists of a young officer who passed out of Cooper's Hill three years ago. He represents the professional staff of the Calcutta Civil Engineering College at this moment.

Sir *George Campbell.*

3375. Is your information quite recent?—Within the last three or four years that has been the condition of the Calcutta College.

Mr. *Onslow.*

3376. What is the average number of pupils at that college?—I can hardly answer that question. The college now has been affiliated to what is called the Presidency College; and it forms merely a branch of the Presidency College; it is called an engineering college, but the professional establishment for teaching there consists of only one young engineer.

Chairman.

3377. What would you propose with regard to colleges in India; do you think that the present system is satisfactory by which Europeans and natives compete for what is practically a free education?—I would say that, I think, we are sending out for too many Europeans. I think it is a very great misfortune and extremly undesirable for the welfare of the service that the staff should be so largely composed of Europeans. It is undesirable, I think, for several reasons; first of all if you have a great number of European officers permanently attached to the public service, the hands of the Government are very much tied in dealing with the questions of public works for the future; if for any reason you wanted to reduce the expenditure of the Public Works Department you would then be landed in the dilemma of either having too many officers or having to tempt them to retire by holding out special inducements in the way of bonuses or extra pensions, or else of keeping up more officers than are needed. In view of such a contingency arising, a large, inelastic, European public service is a great evil. In the next place the European agency is, or should be, much more expensive than native agency, and I think you might by a more economical arrangement of the staff eventually carry on your public works more cheaply. But in the third place it is very bad indeed, I think, for the

Colonel *G. Chesney*, R.E.

18 July 1878.

Chairman—continued.

service itself to be constituted on so large a scale as it is at present. If you have, as you have now, a service consisting of 1,200 officers, of whom the majority are serving in a subordinate capacity, it stands to reason that promotion must be slow; if you have slow promotion you have a discontented service, and you have a badly paid service. Now the Public Works Department has been so rapidly created, that there is not yet time to see what the natural state of promotion will be, but I think we can infer from what we know of the British services, which are under analogous conditions, what the promotion is likely to be. In my own regiment of Engineers, the proportion of junior officers to senior officers is about one and a-half to one, and it is found that, without augmentations, and trusting to the ordinary modes of promotion, an officer will be from 12 to 16 or 17 years in the subordinate ranks. That is a most serious evil in any branch of the public service, and especially, I think, in the Engineer service. I cannot conceive of any worse use that you can turn a man to, as soon as he is an efficient officer, than to keep him in a subordinate capacity for many years. In former days, when the department was young, it was a common thing for an officer to be promoted from assistant engineer to be executive engineer in a couple of years. That perhaps was too rapid a promotion, for very often he had not sufficient experience; but now that engineers are much more highly trained than they used to be, you will have in a short time men who are quite fit for higher duties, for whom higher duties cannot be found. I think, therefore, that it would be extremely politic to do for the Engineer service what has been done already for the Indian army. In the Indian army, under what was known as the old regular system, there was a large number of subalterns in a regiment, a small number of captains, and a still smaller number of field officers; and promotion being entirely by seniority, the promotion was extremely slow. Now, under the new organisation, the number of superior officers is the same as before, but the number of junior officers has been very largely decreased; and what is the result? You have now a comparatively well-paid, a highly-contented, and a highly-efficient public service in the army. The subordinate duties have been placed upon native officers who not infrequently have been brought out of the obscurity that they occupied before, and put into positions of responsibility.

3378. You say that the number of officers in the lower grades has been largely decreased; you mean, I presume, in the number of European officers?—Yes, in European officers; in former days a native regiment had 23 officers; it now has only seven.

Mr. *Hardcastle.*

3379. Are you referring to the army in general, not to the staff corps?—To the officers with native regiments. A regiment formerly had 11 lieutenants, seven captains, and two field officers; it now has only seven officers altogether. Of these, generally speaking, two or three will be captains, and two at least would be field officers; the promotion therefore is now very good. The duties formerly performed by European subalterns are now performed by native commissioned officers. I conceive that in the interests both of

Mr. *Hardcastle*—continued.

the Government and of the Public Works Department, and of the officers themselves, and also of the people of India, it is extremely desirable that a great reduction should eventually be made in the number of European engineers employed; that the service should be so organised that every efficient officer should get his promotion to a position of responsibility in a few years, instead of in a great many years, and that the subordinate business of the department should be conducted mainly by natives.

Chairman.

3380. By what means would you carry out your proposal, and at the same time educate candidates for the Public Works Department?—The first thing, no doubt, is to educate the natives up to the necessary point; but I should explain that, besides the engineering branch of the Roorkee College, there is a very large vernacular branch for training natives only. The college was originally established with the view of training natives; but in those days the state of education in Upper India did not furnish a supply of natives who were qualified to pursue their studies in English, and therefore the classes of Roorkee were vernacular classes, in which the instruction was given entirely in the vernacular. The staff of officers appointed to teach at the college were young Engineer officers who did not know the vernacular, and thus the professors were not able to communicate with the pupils; that was the condition of things when I was on the staff of Roorkee, 22 years ago, and I have reason to believe that it has continued ever since. Then the idea of having an European class was gradually grafted upon the original scheme, and the result has been ever since that the whole staff of Roorkee is practically employed in training the small class of Europeans, and the native classes are handed over to what are called moonshees, a staff of teachers who really are on the same footing as certificated schoolmasters in English Board Schools, and not engineers at all. I conceive that the first reform which is required is to organise Roorkee as a native college for native students only, in which the instruction given should be in the English language. The state of education now in the North West Provinces is such that it is quite possible to get a sufficiency of students capable of following our course of instruction in English. It seems to me that the time has gone by for maintaining the European class at a great cost to the State, and that it is no longer necessary. I observe in the last report to hand of the Roorkee College, it is urged that this class ought to be kept up in the interest of the Himalayan schools, which supply the pupils. I fail to see any claim that those schools have for being supported, as they are now, in effect, by State money, which any school in England could not equally claim. Roorkee now costs nearly 20,000 *l.* a year. Cooper's Hill College costs about 800 *l.* a year; that is to say, the fees are about 800 *l.* short of the expenses.

Mr. *Fawcett.*

3381. Do not the accounts show a larger loss than that?—Yes, the accounts show a larger loss, because a part of the fees is recovered in India as deferred payments. Every student is at liberty to pay one-third of his fees after he enters the public

Mr. *Fawcett*—continued.

public service, and those recoveries are brought to account in India, and are not shown in the public accounts at home; but the estimate for this year is less than 21,000 *l.* expenditure, and the receipts are rather more than 20,000 *l.*, the difference being about 800 *l.* a year; whereas Roorkee costs about 18,000 *l.*

Mr. *Onslow.*

3382. Does that include your salary?—It includes everything.

Mr. *Fawcett.*

3383. Does it include interest on the capital expended in purchasing Cooper's Hill?—No; it includes the current expenditure of the year only.

3384. Then it is not a strictly accurate account to say that it only costs 800 *l.* a year, because there would be a very considerable outlay in buying it, which the people of India have to pay?—The cost of buying the building having been already defrayed out of the revenues of the year in which it was bought, it would surely be entirely inaccurate to consider the interest of that expenditure as another charge.

3385. But referring to the question of Indian finance, if at the time that Cooper's Hill was bought, the Treasury spent 50,000 *l.* for India, and at that time they had no surplus, that money was virtually added to their debt, and was paying interest. You cannot get the money out of nothing, and therefore it comes out of the pockets of the people of India?—Unquestionably; but you might say the same of the cost of the army, that the interest on the capital account of the cost last year of the army should be added to the cost this year of the army, and so on indefinitely.

3386. No, because that is an establishment charge, and to show the account you surely must estimate the cost of the building; you cannot say, for instance, that if the people of India paid 50,000 *l.*, and you get an establishment, though you do not pay every year the interest of the money, it makes no difference; the money has come out of their pockets that you give to those students in order to make them self-supporting; the Indian people have made a present to a certain number of English young men of a place at which they can receive their education at certain charges?—Unquestionably that present has been made, but to consider the interest of that present would be, I think, entirely fallacious; if that is to be done, why should not the interest on every public building which has ever been constructed be charged as part of the expense of the department concerned for the year?

Chairman.

3387. As I understand your answer, in comparing the annual cost of the two establishments of Cooper's Hill and Roorkee, what you wish to point out is that Cooper's Hill and Roorkee having been both established, there is a loss in the working of one of 18,000 *l.* a year, and in the other of about 800 *l.*?—Quite so; and in neither case has the cost of the buildings been included.

3388. I think we interrupted you whilst you were giving us in detail your proposals as regards the education of natives in India; will you kindly continue your observations upon that point?—I think I was saying that it seemed to me that the first thing to be done was to reorganise Roorkee as an Indian college for the training of Indian engineers; I conceive that that must be done at the public expense, because the notion of obtaining candidates in India to pay the expense of their own education is not practicable. The European engineer class, it seems to me, has fulfilled its purpose; it has supplied some extremely useful men, but it has been very costly, and is no longer necessary. Then I would wish to submit to the Committee another point. Besides this engineer class at Roorkee, and the vernacular class, there is also what is called the Second Department, which consists of European soldiers for the most part, who are educated for what is called the Upper Subordinate Branch of the Public Works Department. This branch consists chiefly of non-commissioned officers or private soldiers who pass an entrance examination, and spend a year at Roorkee, on the expiration of which they pass out of the college, and are appointed to the Upper Subordinate Establishment of the Public Works Department. This branch of the department I think is, by universal consent, the least satisfactory part of it; those soldiers have been accustomed to military discipline, to barrack life, and to living with their comrades, and they are sent out into the jungles by themselves; they have no companionship, and no resources in themselves, and it is notorious that a very large proportion of them turn out very badly. I made up a return the other day of the casualties occurring in this branch of the service, and I found that no less than 15 per cent. of the total strength was got rid of every year, either from death or from dismissal; that is to say, one-sixth of the establishment had to be renewed every year; I think that it would be a most valuable reform to replace that department gradually by a class of respectable native engineers. Although those upper subordinates, as they are called, receive low salaries as compared with the engineers, they are still very respectable salaries as compared with those drawn by native officials in other departments; the salaries of those upper subordinates range from 100 *l.* a year to about 500 *l.* a year, and, therefore, without saying that they should be exactly replaced by natives occupying an exactly similar position, it is quite possible, for the same cost, to organise a service which should not be more expensive than the present, and which should be much more satisfactory, and from which the best men should be promoted as they deserve it, to the upper or Engineer Establishment; I think that that would be very preferable to admitting natives in the first instance, without any proof of their qualifications, into the Engineer Branch directly. Unquestionably the present system, which was most liberally conceived, namely, of admiting natives to the Engineer Establishment on precisely the same footing as Europeans, has not been successful. I believe the truth to be this, that whereas with an European the possession of certain intellectual qualifications is no bar to his having also physical qualifications, it is found that what may be called the learned or literary class in India is not physically an active class; and that the men who have been trained in our Government colleges as a rule have not made active or efficient engineers. I should like to see a lower stratum,

Colonel *G. Chesney*, R.E.

18 July 1878.

Colonel G. Chesney, R.E.

18 July 1878.

Chairman—continued.

as it were of Indian society tapped, and a more practical and more robust class trained in our colleges, and sent out to take a position, in the first instance, subordinate to that of European engineers, but with the understanding that all deserving men should be promoted.

3389. Then your proposal of course would not only affect Roorkee, but any college established in India for the admission of individuals to the Public Works Department?—It would; I should observe that when Cooper's Hill was first established public opinion was by no means ripe for the consideration of the question, whether natives should not take the place of Europeans; the question then, as I said before, was simply, there are a certain number of European engineers required, what is the best way of supplying them? It would have been quite useless at that point to have suggested, instead of supplying them at all, to supply natives in their place, and any change, such as I venture to advocate now, must be very gradually carried out. The first thing to be done, for example, in my view, is gradually to replace the upper subordinate establishment by natives; that upper subordinate establishment contains nearly 600 Europeans, and some of those men, no doubt, turn out most valuable public servants. Occasionally you get a hard-headed European soldier, who is steady and honest, and that man becomes quite invaluable; but I am sure that any honourable Member of the Committee, who is acquainted with India, will bear me out in saying that that class have done more than anything else as a body to lower European character in the eyes of the people of India, from their intemperate habits, from their want of education, and in various other ways, and from their want of integrity. Therefore the supersession of that class gradually by a class of respectable native engineers, would in my view be a most valuable reform, but it must take many years to accomplish; but when that is done, I conceive that the European upper establishment also should in part be very much reduced, and their places taken by a superior class of native engineers; but all that must be a work of time. The first step in the work of reform is to get the opinion of the public services in India to that way of thinking.

3390. Your first step, as you propose, would be to prevent Europeans entering the Public Works Department, except through Cooper's Hill?—I confess, for my own part, I should be sorry to see Cooper's Hill the only avenue for the admission of Europeans. I am speaking, of course, of civilians, because military men enter by another channel. I think that in a great service like that, it is very desirable if possible to have as many different avenues of admission as possible; but I should like the alternative to be not between Cooper's Hill and some other college, but between Cooper's Hill and men appointed, not through a college, but appointed directly after some amount of training as civil engineers. The difficulty is in selecting men in that way, to be quite satisfied about their qualifications beforehand, because although you may engage an engineer in India for a temporary engagement, as a matter of fact, if a man is once engaged, unless he entirely misconducts himself, he is quite sure of being permanently appointed. But if some way could be seen of admitting a certain proportion of the engineer staff of the Department otherwise than through the colleges, I think it would be a very desirable thing.

Chairman—continued.

Mr. *Fawcett.*

3391. Would not any scheme of that sort that may be devised introduce all the evils of patronage?—The first time that the Government made a large selection of engineers directly for the public service, they appointed two officers (of whom I was one), and desired them to select a number of civil engineers directly. Of course there was room there for patronage, and for jobbing; but the persons who were nominated for the duty did their best to make the selection without favour. Probably where they failed was in selecting some incompetent men, through being misled by the testimonials submitted, because they had nothing but the testimonials to go by; there is the difficulty.

Chairman.

3392. The honourable Member for Hackney's objection, I think, is the difficulty of working a system of patronage along with a system of competition, because to whom would you give those appointments; it would be to the Indian Government, I assume?—It would be very desirable that they should be made in England, if they are made at all; the field in England is much wider than in India.

Mr. *Fawcett.*

3393. Is not it your experience, as an educationalist, and as a public man, that you can place very little reliance after all on testimonials, inasmuch as they are so often prompted by good nature, although men do not conscientiously give those testimonials intending to mislead, yet acting upon testimonials you are perpetually misled?—You must read them between the lines, certainly.

3394. A skilful writer of testimonials can mislead the most experienced reader between the lines, can he not, very often?—There are, no doubt, great difficulties in the way of appointing by any mode short of examination.

Chairman.

3395. If your suggestion were carried out, of course the number of highly trained officers who annually would go out from Cooper's Hill would be diminished, because the number of the establishments that they would supply would be largely diminished also; what would you do as regards the vacant places at the Cooper's Hill College?—In the first place I would say that we have hitherto had more students than we have proper room for. The first step in reduction would be to give us only the proper number. At present we have always been too crowded. Then the next step, no doubt, would be, and I think it would be perfectly easy, that we should have to fill up their places by other students, who would come simply for the sake of the education to be got there, and eventually I should hope that a time might be reached when the nominations to the public service should be given, not when they enter Cooper's Hill, but when they leave it; that, in fact, whatever the number of appointments might be, they should be competed for amongst the students at Cooper's Hill.

3396. There is no engineering college in England, is there, to which civil engineers go for a thorough

Chairman—continued.

thorough course of training?—There are numerous colleges which professes to give an engineering education, but they have always been under this difficulty, that the profession has not patronised them at all. An engineering training, in any college, does not help a young man to getting employment. The fact is, that civil engineers in large practice have a ready mode of selection in the number of pupils who come under their observation, and they can always choose the best. They probably are quite satisfied with the system of simple selection, but when the Government comes into the market it has not the same means of winnowing out the good men from the bad; and therefore, for the purposes of the Government, I apprehend that the mode of selection that such a college gives is invaluable; but I have no doubt that an engineer in large practice, who has a great many pupils, can very readily select fit assistants without any examination at all; and the result is, that they do not take pupils from the colleges.

3397. At present Cooper's Hill College is over-crowded; I think you have, in various stages, 150 pupils?—We have nominally 150; our actual establishment at this moment is 138.

3398. Of course, if that number was considerably decreased, there would be a considerable loss in the receipts now received by Cooper's Hill College, and I put my question with a view of ascertaining whether you thought, if a considerable number of vacancies in Cooper's Hill College were thrown open to the public, you would be able to fill them up, candidates being ready to go there, and to pay the necessary fees in order to get a good education?—I think it is extremely probable that the college would receive the support of the profession to a very considerable extent, and that it would be quite possible to keep Cooper's Hill going, on a strength sufficient to make it self-supporting, or nearly self-supporting, although only a portion of the students were destined for the public service.

3399. Have you ever consulted any of the heads of the profession on that subject?—I have been in communication with one or two of the senior engineers, whose idea was that, in some way or the other, the college should come under the patronage of the Institution of Civil Engineers, and in some way be recognised and supported by them; but no definite scheme has ever been worked out to that effect. In fact, the time has not come, because we are not in a position yet to receive the outsiders.

3400. Supposing that the time ever should arrive, you do not see any insuperable objection to it?—I see no objection, because I think that in no other way than by State assistance is it possible to give that complete education which engineers require. I may mention that we have at Cooper's Hill a staff of 15 officers, all of whom, I may say, are very fully engaged in teaching, because for engineering you require a great deal of individual attention. Most of the so-called engineering colleges represent our 13 or 14 men by one single officer; and it is quite impossible that any one man, however capable he may be, can give the same education that a dozen can give.

Mr. *Fawcett.*

3401. Would not there be a difficulty in getting the engineering profession to recognise Cooper's Hill by sending students there if there were vacancies for them, because the present system of charging extremely high premiums, which is maintained by civil engineers, makes them, of course, interested in the maintenance of the present practice; it is no uncommon thing for a young student who goes into an engineer's office to pay a premium of 500*l.* or 700*l.*?—No doubt there is this difficulty; but I think that gradually, but slowly, a feeling is coming over the profession in England that we are very much behind the continental nations in the scientific education of our engineers. Abroad, every country now has its State engineering colleges supported quite regardless of expense, where a very complete education is given, and where the most perfect appliances are supplied by the State at an almost gratuitous charge, where the number turned out for the public service is extremely small. For instance, at the great College of Delft of the Dutch Government, everything that can be desired for teaching engineering is supplied, and I believe that the number of officers who enter the public service from Delft is about two a year; the others all go into private life.

Sir *George Campbell.*

3402. Do they supply the Dutch East Indies from that college?—I am not certain. Then again at Ghent there is a magnificent college from which the best students are appointed to the public service, and the others go into private life. I think there is a feeling in England now that we are behind other nations in that respect, and that a time is coming when our engineers will have to be trained scientifically as well as the engineers of other nations.

Mr. *Hardcastle.*

3403. Are the students trained gratuitously by Government at Ghent and Delft?—The fee is a very small one. It is almost a gratuitous education.

Mr. *Onslow.*

3404. You do not mean to say that ordinary English engineers would not bear a favourable comparison with foreign engineers?—The English engineer has had enormous advantages in the great experience he has gained from the enormous quantity of practical work which has fallen into his hands. And possibly the abler men have felt that just in proportion as the general standard of education is low, will the men of talent rise to the top of the profession by force of ability. Natural selection comes more readily into play under such conditions.

3405. Are you aware that foreign Governments generally select English engineers for their large undertakings?—They have done so, no doubt; but I think that foreign engineers are beginning to do their own works, and very ably.

Chairman.

3406. To sum up your proposals with regard to the supply of officers to the Public Works Department, I understand that you would create different posts in the Public Works Department, reserving the upper posts for Europeans who should pass through Cooper's Hill College, or be nominated to a limited extent by the Secretary of State; and then you would introduce largely the

Colonel *G. Chesney*, R.E.

18 July 1878.

Chairman—continued.

the native element into the lower grades, with the view of ultimately filling the whole of them, and you would also propose that those natives so introduced who showed their capacity should be promoted to the higher grades?—Yes, gradually replacing the Europeans by natives.

3407. By those means you think that considerable economy would be effected, and that the general working of the service would be more efficient?—I think so; I should observe that when the plan of admitting the natives into the Engineering Department was first established, an experiment was made for the first time of bringing them in on the same salaries as the European engineers received; I believe that the Public Works Department is the only branch of the Indian public service in which natives and Europeans are precisely on the same footing. In every other branch of the service I believe that there is a very large difference between the salaries received by a native and by a covenanted Englishman. For example, the salary of a European district judge is 3,000 *l.* a year, whereas the highest salary which can be drawn by a native judge, who, it may be said, has quite as high judicial functions to perform as the European, is about 700 *l.* a year; and that inequality runs through all the other branches of the public service; but in the Public Works Department the native engineer gets precisely the same salary as the English engineer. I think that that has been a misfortune for the native engineers, because all the superior officers of the Service would rather have what they consider a more efficient article at the same price; and that has stood in the way of the advancement of the natives; and the arrangement, I think, is indefensible, because the salaries paid to European engineers are not what they would command in their own country; they are a special rate paid to them, because they are exotics, so to speak, undergoing certain disadvantages in respect of leaving their own country, and being put to great inconveniences in the way of living. There is no reason whatever for paying the natives the same rate; as long as the system continues the higher officers of the Department will prefer having Europeans under them; if the native was a cheaper officer than the other, you might begin to discover the advantages of employing natives instead.

3408. I have not asked you any question as to the class of works which those officers should be engaged in constructing and designing, as to which I believe that you generally agree with General Dickens's evidence; but there is one point upon which I should like to ask your opinion. A witness has been before the Committee who is a very strong advocate of the combination of navigation with irrigation, by way of making canals all over India, which should do both the work of irrigation and that of the railways; have you ever considered that question?—I have given considerable attention to that question, and I would make the following remarks: An irrigation canal, I need hardly say, is a running canal; it has a stream always in one direction. Whenever inland navigation has been found successful in European countries, it almost always is a tidal navigation in which there is a current running for part of the day one way, and part of the day the other way, and in which barges can get about without much

Chairman—continued.

cost and labour to move them; but in India the cost of moving barges or boats in one direction must always be very considerable, because of the strong current which is against them. If, on the other hand, steam power is employed, the wash on the banks would be highly destructive, because the canals are almost entirely made with clay sides, which are very easily destroyed by the action of any wash. There is another point to be considered which is very important, and it is this, that in almost all cases of irrigation works the supply of water is partial. To give an illustration, the Ganges Canal, at a given point in its course, bifurcates into two channels, and each of those channels is supplied with water in alternate weeks. To make the upper part of the channel large enough to keep both those lower channels always supplied would be unnecessary. Therefore, what is arranged is that every week one-half of the lower part of the canal is cut off from the supply water; such an arrangement would be fatal to the navigation, because it would leave the boats stranded one week in two. Then, again, the navigation must obviously be regulated not by the size of the canals, but by the size of the locks. If the locks are made large enough to admit considerable steamers, they become very expensive indeed. Then, again, it is quite true there is no waste of water in the locks throughout such a canal, because the water that is carried through a lock merely goes to a lower reach and serves for irrigation somewhere else; but, wherever the canal ends, where it joins the river, as at Cawnpore, where the Ganges Canal runs into the river, every time the lock is opened to let a boat through, there is a great waste of most valuable water to let it through; therefore it seems to me that navigation is almost incompatible with irrigation.

3409. If we were to depend entirely for means of transport upon navigation canals, which also did the work of irrigation, the strain upon them would be greatest, of course, during years of drought; and it would be then almost impossible to combine the two purposes, for, if you were to use the canal for irrigation purposes, it would be so emptied of water as to be unavailable for transport?—The strain of the navigation would come, no doubt, just at the very time that every gallon of water was of supreme importance, and when all waste would have to be avoided.

3410. This question has been considered very carefully more than once by the Indian Government, has it not?—It has been considered very much by the Irrigation Department, and the conclusions to which some of the most able of irrigation officers came was, that to have a proper navigation we must have an entirely separate canal apart from the one used for irrigation, and supplied from it; and that would be, of course, enormously expensive.

Sir *George Campbell.*

3411. That was not generally acquiesced in, was it?—I think that the conclusion they have come to from the experience of trying navigation on the Ganges Canal is, that in order to have good navigation, there must be little or next to no current, and this condition practically involves a separate canal. There is another great difficulty to be mentioned in connection with navigation, that in those running canals which have a great

Sir *George Campbell*—continued.

great quantity of sediment in the water, there is great difficulty in working the locks; the sediment brought down is so large that it is very apt to block the lock-gates. They find in the Ganges Canal very considerable difficulty in working the locks, in consequence of the deposit of silt in the bed. If the lock-gate is left closed, even for a few hours, a great deposit is formed against it.

Chairman.

3412. As a matter of fact no navigation canals, except those in the deltas of Madras, have given any return?—The navigation on the Ganges Canal is quite trifling. Certainly the Ganges Canal contains defects which would be avoided in any fresh work of that kind. The slope of the bed is somewhat excessive, and no doubt in any future works a more moderate velocity would be given to the stream by having less slope of the bed. But it must be remembered that just in proportion as the slope of the bed is reduced, and the velocity diminished, so does the size, and therefore the cost of the canal increase, for a given quantity of water.

3413. And therefore, looking at the question practically, you would not advocate the construction of canals all over India with the view of combining navigation and irrigation?—Certainly not.

3414. Do you wish to add anything more to the evidence which you have given?—There is one point on which I should wish to offer an observation. I refer to the charge for compound interest, of which one hears a good deal. It has been objected, I think, to the form of account which is now proposed, that it does not include compound interest, and that the cost of the works shown in this new account would not be the veritable cost, because compound interest is included.

Sir *George Campbell.*

3415. Is any interest included in the present account?—Not in the capital account; not even simple interest.

Mr. *Onslow.*

3416. This is for irrigation, not for railways?—It applies to both accounts; and it seems to me that to introduce any considerations of compound interest would be entirely erroneous, and would land you in an absurdity.

Sir *George Campbell.*

3417. You are speaking now of compound interest, especially as distinguished from simple interest?—I am speaking first of compound interest; simple interest of course has to be paid every year upon the loan which is provided for out of the revenues of the year; and if you have paid interest on the loan out of the revenues of the year, then the question of compound interest disappears, as it seems to me.

3418. Also all questions of simple interest?—No, that arises because you have to pay it every year; but taking into account the simple interest as part of the charge to be made out of the revenues of the year, and having paid this simple interest, I cannot see upon what possible ground it can be considered legitimate to raise the question of compound interest.

3419. In the case of an extraordinary work which is not made from the revenues of the year,

Sir *George Campbell*—continued.

but from borrowed funds, what do you say?—You borrow money and you show that debt; you pay interest upon that loan, and you show that as part of the charges of the year. There is an end of the matter, as far as the accounts are concerned.

Colonel *G. Chesney*, R.E.

18 July 1878.

Mr. *Fawcett.*

3420. Is not this the case, supposing, we will say, that two works are carried out for the same initial expenditure, and the ultimate revenue of them both is precisely the same, each of them we will say producing a revenue of 200,000 *l.*, but that one takes so long in construction that you wait 20 years before you get any revenue at all, and the other one pays a revenue at the end of the first year, the cost of the one must be very much greater than the cost of the other, looking at the financial result of the two works?—No doubt that is true; in one case you have paid a considerable part of the cost on the works for the numerous years during which the works have remained unremunerative, but having paid for that out of the revenues, one has no right, I think, to make up a fresh account showing a large charge for compound interest still accruing, which has yet to be paid.

3421. But looking at that case, if for one work you borrowed money at 5 per cent., the interest at 5 per cent. on 2,000,000 *l.* would be 100,000 *l.* a year, would it not?—Yes.

3422. At the end of that period you would not only have spent 2,000,000 *l.*, but you also would have had to spend 100,000 *l.* for 20 years for interest; the real cost of that work, put it how you like, to the people of India, is 4,000,000 *l.*, and not 2,000,000 *l.*; and therefore 4,400,000 *l.* has been taken out of their pockets to produce that work before getting any return at all, and ultimately they do not get a larger return than upon that which begins paying at once?—Yes, but that is merely saying that, if a work is a long time in recouping itself, it is not so good a speculation as a work which will pay for itself soon.

Mr. *Hardcastle.*

3423. It would not be the custom in India, I presume, in commencing any public work, to borrow 2,000,000 *l.* all at once, and therefore to have to pay 100,000 *l.* a year, say for 20 years. I presume the money would be borrowed from year to year as it was expended?—I did not understand the honourable Member to mean that the money should be borrowed at once.

Mr. *Fawcett.*

3424. Then, in that view, why the capital and the minimum of interest should be included is this, that, in determining whether a work is sufficiently remunerative to justify a government in carrying it out, you have not only to consider the actual cost of the work and the ultimate return of the work, but you have also to consider, as another very important financial element, the time which will elapse before this ultimate return, whatever it may be, will be secured?—Unquestionably; but then, I think, there is this to be remembered, that, supposing this interest that you have been paying all those years upon unremunerative works had not occurred, it by no means follows that, therefore, the people of the country will have been saved that amount

Colonel *G. Chesney*, R.E.

18 July 1878.

Mr. *Fawcett*—continued.

of expenditure. We must consider that in India there are a number of conflicting interests that are striving to get hold of the Treasury, and to get their share of the expenditure, and if that money had not had to be paid on the interest of that work, instead of being saved in taxation, it would probably have gone to some other mode of expenditure.

3425. The remark applies to everything; for instance, we will suppose that the spending of 150,000*l.* in building a country house for the Governor of Bombay was an extraordinary waste of public money. Your argument would be equally as well that, if the money had not been spent there, it would have been spent somewhere else?—The argument must only be taken for just what it is worth.

3426. Your argument would equally apply to any expenditure whatever, would it not?—It would apply so far, that in a country like India, in which the finances are barely in a state of equilibrium, if the money is spent, you must consider whether it has been spent usefully or not, bearing in mind that it would probably have been spent in any case.

Chairman.

3427. The principle at present upon which the Government sanction expenditure upon public works is as follows, is it not, that if they estimate every year that there will be a certain return from all the works which are in operation, and they also estimate what the amount of the interest upon that capital expended will be, and they add the working expenses to that interest and balance them against the receipts; and inasmuch as the receipts are not sufficient to cover the working expenses and the interest, the difference is paid out of the revenues of India?—Yes, that is so.

3428. Then if we were to introduce into this very simple principle the complications of compound interest, this account would become quite misleading?—It would be quite impossible to introduce it into the account under any circumstances, because, having once paid the interest, you cannot possibly pay it over again.

3429. Therefore, is it not a better plan not to include the compound interest in the Revenue Account presented to Parliament, but simply to show what the actual loss each year is upon the public works itself, and then to have a supplementary account in the Accounts and Estimates presented to Parliament, which show what the exact financial result as regards each individual work has been, and in this account compound interest might be charged upon all the works?—I conceive that it would be erroneous to introduce compound interest into any finance account, because the simple interest having been paid already, the compound interest cannot possibly arise. If, for example, a man owes a debt, and does not pay the interest thereon, the account, no doubt, would show an accumulated charge for compound interest, but if he pays interest year by year, no question of compound interest can arise on that account. That is the position of the Indian Government, so long as it defrays the interest year by year of its Public Works loans. If you like, in any statistical account or abstract, to adopt the incidence of compound interest as a matter of curiosity, or as a matter showing the comparative utility of the works, then it becomes an unobjectionable way of illustrating the case, but it ceases

Chairman—continued.

to be an account. I think it is merely then a sort of statistical *résumé* of the state of the case.

3430. As to other Governments who more largely embark in Public Works than the English Government, do you know any case where in the accounts which they present to their different legislative chambers, they adopt the principle of charging compound interest on works which do not pay?—I do not know of any case.

3431. In the English Treasury Accounts presented to Parliament that principle is not adopted?—No, and I cannot see how it is possible to be introduced without making a mistake.

3432. On the other hand, there is considerable force in the point raised by the honourable Member for Hackney, which is that two works might be sanctioned by the Indian Government which have cost exactly the same, one of which would pay almost from the moment it came into operation, and the other would not pay for some 20 years; but that fact would be taken into consideration by the Government before they gave their sanction to the work?—I think there may be shown in the Statistical Returns the incidence of the accumulated charge for interest, supposing it had not been paid, as a matter showing the comparative excellence of the two works in a financial point of view, only I would not call that an account, illustrating the case from another point of view; it is merely a statistical statement.

Mr. *Fawcett.*

3433. All that I am contending for, and I think you agree with me, is that it is an element which ought to be taken into consideration before determining whether any particular work should be undertaken; I do not want that it should be necessarily included in the account, but you would admit, would you not, that it is an element which is deserving of the consideration of the financier?—It is a most important element, and should be clearly kept in view, only it should be separate from the Government account.

Sir *Joseph McKenna.*

3434. I want to put a question on this very point, which according to your answers strikes me as containing the evidence which you have given to us upon the subject, and you will perhaps correct me if I am not putting the question to you quite rightly. As a matter of arithmetical investigation, I understand you to say that it may be well to have data, and to examine them to enable us to judge how far any particular work has been more or less successful, or remunerative, *ab initio*, but that you nevertheless consider that it would be useless to carry out any system of public accounts to show the working all along; and I understand you to consider that though it would be useful, in furnishing those accounts, to show in the account for the year whether a particular public work has been remunerative or costly during that year, yet that it would be quite useless to drag a lengthening chain in the accounts furnished for public examination, in each case to show what would have been the scale of profit or loss *ab initio*; I understand you to negative altogether the idea that accounts should be furnished by the Government, so as to show those results on the face of them year by year, although you would maintain a system which would enable that to be ascertained

Sir *Joseph M'Kenna*—continued.

tained on investigation in each case?—I did not intend to convey that impression; my idea was that the two things should be kept quite separate, but they should both be stated; that is to say beside the accounts of the year showing the charges of the year, and those only, there should also be a complete statistical statement furnished showing the financial condition of those works *ab initio*; that I conceive to be quite as important in its way as the other consideration, only the two things should be kept distinct.

3435. In furnishing the annual accounts of receipt and expenditure, you would not include in that account any amount of interest, simple or compound?—Simple interest must be included, because it has to be paid year by year.

3436. It would come in as so much expenditure?—Decidedly.

Mr. *Hardcastle.*

3437. The honourable Member for Hackney put the case of two public works, one of which was completed immediately, and the other took 20 years. As a matter of practical fact, are there any public works in which the expenditure of the same amount of money would be so exceedingly rapid as compared with other public works; that is to say, could you spend a million on one class of works only in a year, whereas it would take you 20 years to spend it on another class of works. Are not public works, in other words, as a matter of necessity, works which take a long time for the expenditure of money?—I understood the honourable Member rather to refer to the time of the return coming in. It might be said generally that railways begin to return much quicker than irrigation works. The Rajpootana Railway pays four per cent. already, although it is barely open; but an irrigation work has very seldom paid a return at once.

Sir *George Campbell.*

3438. I think you said that you had charge of the Peshawur canals in your day; is it not the case that most of those canals were native canals?—They were.

3439. Can you tell us the system under which they were managed; did the Engineers Department take charge of them, or merely give aid to the native administration?—They were entirely under European officers; they were laid down extremely roughly, and the works often so bad as to be almost incapable of improvement, and numerous schemes have been prepared for doing away with those canals, and substituting a better system; they were extremely defective also from interfering with the drainage of the country, and were believed to be the cause of a good deal of the Peshawur fever.

3440. Was there no system of native or indigenous administration under which any of those canals were managed?—I am speaking now of the canals in the immediate neighbourhood of the town of Peshawur, but those canals also served the purpose of irrigating the Peshawur district, which was entirely, I believe, in the hands of the native village communities themselves, and we had nothing to do with them.

3441. But, as I understand you, the maintenance of the canals was entirely in the hands of European officers, and not managed by the villagers?—Yes.

3442. Without entering into a controversial

Sir *George Campbell*—continued.

question as to whether interest should be charged in addition to capital, or not, as regards these Public Works, is it not the fact that up to a recent period the Public Accounts did exhibit accumulations of interest, and that the new account which has been introduced suppresses that information?—I do not know of any public account in the proper sense of the term, which exhibited compound interest.

3443. Is it not the case that up to a recent period the account published by the Government exhibited in the case, we will say, of the Ganges Canal in one column the capital alone, and in another column the capital with accumulated interest, that is, with simple interest only?—It depends exactly upon what you mean by an account. The accounts of the Government certainly do not show those charges for interest. The statistical abstract or return relating to those canals does show the interest in one of the forms used, combining it with the capital expenditure, for the purpose of showing the results; but that information must be regarded, I think, as quite distinct and separate from the financial accounts of the Government.

3444. Statements of that kind, showing the accumulated interest, were published in the "Gazette" for the information of the public?—Yes.

3445. Under the new system, that information has been suppressed?—I presume that it would be still supplied, if required.

3446. Do you understand, or are you aware of your own knowledge, that for the past year in the latest accounts, that information is supplied to Parliament?—I have not seen the accounts of last year.

3447. But is it not the case that the accounts are now to be supplied to Parliament in the new form to which the noble Chairman has alluded in examining you, and that that new form does exclude all information as regards accumulated interest?—Yes, but I apprehend that that form will be supplemented also by a further return showing what the indebtedness would be if you took into consideration the compound interest.

3448. Do you mean to say that it ought to be, or that it is, supplemented by a further return?—The Canal Department publish very complete returns of their canals and the results of them, and I have no reason to suppose that those returns will be discontinued.

3449. Is not the information supplied to Parliament limited to the new form, in which this information is suppressed?—If you speak of that particular form, no doubt it leaves out compound interest entirely.

3450. Is it not your opinion that if it is desirable that Parliament should have the means of judging whether those works are really remunerative or not, that information with regard to the interest should in some shape be supplied to Parliament?—I think it would be useful, certainly.

3451. The main object of the inquiry of the present Committee has been considered to a very great degree to be that Parliament should be kept informed whether, upon the whole, public works are remunerative or not; and the fact whether they are remunerative or not, does largely depend upon this, whether taking the accumulation of interest into account, they do pay a fair return for the money expended, or

 not?

Colonel G. Chesney. R.E.

18 July 1878.

Sir *George Campbell*—continued.

not?—Yes, but it is quite easy to supply information without treading upon the question of compound interest; as for example, you show what have been the charges for each year's interest upon loans from revenue for a certain number of years; and in that way you are able to arrive at the financial result of the works equally well, as if you bring in an imaginary charge for compound interest.

3452. In order to get the final result you must add up, must you not, the interest for the series of years in which it has been charged in each year?—I think that the new form of account would give all the information that is wanted; it is far better if you want the history of any particular work to compile it from the commencement. If you attempt to frame an account which shall give all the varied ways of looking at it that it may be conceivably be desired to have, the account becomes overlaid with so much information that people will not look at it I may mention that, in former years, we kept the Public Works accounts in India in a most voluminous and complicated way, in order to be able to furnish certain aspects of the account every year. That voluminous and complicated system has been very much simplified and reduced, and the result is that now, if you want to get information with respect to any class of facts, you have to compile it for the occasion, which I think is a very much better way than always anticipating every possible need that may arise.

3453. Is not this simplicity attained at the cost of one-sidedness, inasmuch as you present annually only an account which excludes a very material item in judging of the remunerative character of the works, and you thereby somewhat mislead the public?—I am in favour, certainly, of showing the general result of each work as regards the time which has been occupied in its execution, and I am not prepared to say that it might not be desirable to have even some definite form of account for doing so, but I confess that I prefer a simpler plan as regards the accounts that go to Parliament as a matter of form every year.

3454. Do you not think that there is something misleading in the way in which the present accounts are compiled, inasmuch as the old native works are shown as if they were British works, and the amount expended on repairing or improving, or perfecting those works, is taken as the capital account of the work in a somewhat misleading fashion; for instance, take the most notable example of that kind, is it not wholly misleading to take the money expended by the British Government upon the old Cauvery irrigation works, and to make out that the whole return of the Cauvery irrigation is to be attributed to that expenditure, and that thereby an enormous per-centage is obtained?—In the absence of any information as to what the cost of that work was, the only possible mode of acting seems to be to leave out the cost; but the fact that those works have been partly constructed by native agency in some past time, has been so often repeated and declared, and debated in various public documents, that I do not think there is much danger of the public being misled on the subject.

3455. But still is it not in the end somewhat misleading if you lump together in the same account a work of this kind, upon which a comparatively small expenditure has been made by the British Government, and a great new work, such as the Ganges Canal, which has been wholly constructed by the British Government; and then adding the cost together, and adding the receipts together, you strike an average of the return, which is in reality most misleading, because the British work upon which the return is real, is lumped with the native work, upon which the return as a per-centage upon the expenditure, is really quite unreal?—I apprehend that the capital expended upon that particular work, the Cauvery work, by native agency was so small that it does not appreciably affect the accuracy of the general account; what has been done by British effort is so large in comparison with what was done before, that no appreciable error arises.

3456. Still you are aware that by far the greatest financial results with regard to irrigation were obtained by those native works, before there was that expenditure of British capital?—The tanks of Madras, and all over India, no doubt, were constructed by native agency, but the irrigation from these is not included in the general return of the results of irrigation.

3457. I am directing my attention rather to the case of the Cauvery work, as to which Colonel Crofton has told us that under the native system of irrigation, when we took possession of the country, 700,000 acres were irrigated, whereas after the British expenditure only 740,000 acres were irrigated; therefore as to that case, is it not extremely misleading to attribute the whole of the results of that irrigation to the expenditure by the British Government, which has resulted in the addition of only a very small per-centage to the irrigation?—I have no personal knowledge except in the most superficial way of the Cauvery irrigation.

3458. I think the noble Chairman asked you whether the extraordinary expenditure had not been very much reduced of late years, and I think he used the expression 8,000,000 *l.*, in former years, and 4,000,000 *l.* now; but I understand that in your evidence you state that the 8,000,000 *l.* is the annual average sum not confined to extraordinary works, but including works which are treated as ordinary; can you give the Committee any idea of what is the amount of money expended on extraordinary works at the present time as compared with that spent in the 11 years to which you have alluded?—The expenditure on Extraordinary Works in the year ending March 1877, appears to have been about six and a half millions sterling; the average expenditure during the past 11 years has been about the same, but at the beginning of this period it was much more; there was a large reduction in the middle of the period.

3459. Can you tell us what the average expenditure during the 11 years was, because I think you said that 8,000,000 *l.* was the average expenditure, including both extraordinary and ordinary works?—The total expenditure during the years in question was about 68,000,000 *l.* I should observe that the expenditure in the earlier part of the time from ordinary sources was much more than it is now. In the year 1867, a million and a half was spent upon so-called "Ordinary" works out of Revenue, whereas last year only a quarter of a million was spent.

Sir *George Campbell*—continued.

3460. Does not that result from the change which has taken place in this respect, that a great deal of what was formerly charged to "Ordinary" is now charged to "Extraordinary" expenditure?—That is true, but it must be remembered that the "Ordinary" expenditure used to result very often in a deficit.

3461. Still in comparing the accounts of one year with another, it is somewhat misleading, is it not, that there has been that change, that whereas a great deal was formerly attributed to the ordinary revenue, it is now classed under "Extraordinary"?—The only accurate way as it seems to me of looking at the matter is to consider the whole expenditure as incurred from loans in whatever year it occurred, because in the year in which it was charged to Revenue, as often as not, there was a deficit due virtually to that cause.

3462. But still a distinct line is drawn between work which is expected to be remunerative and work which is not expected to be remunerative; it never has been proposed to charge to extraordinary works, such as roads, upon which it is not proposed to levy any revenue?—Yes; the expenditure on the new barracks was put down in the first instance as "Extraordinary," but it was written back.

3463. Can you tell us what the extraordinary expenditure of the last year or two was, as compared with the extraordinary expenditure of the average of 11 years, which you have alluded to?—The expenditure which was defrayed from loans last year, ending the 31st of March 1877, was about four and a quarter millions. I do not know whether that meets the honourable Member's question.

3464. I do not see how that meets my point, because the expenditure upon loans embraces the whole question of the revenues of India, whether as regards public works, or any other expenditure?—I am speaking, of course, of public works defrayed from loans. The whole of the information is contained in the small Blue Book called the "Statistical Abstract relating to India."

3465. Still, there is an account extrordinary, is there not, which is the sole part that is defrayed from loans?—That is now given in a separate account.

3466. I thought you said that for the last year the extraordinary expenditure was between six and seven millions?—For the year 1877, including the expenditure on guaranteed railways, the total expenditure was nearly seven millions.

3467. I want to compare that with the average expenditure of a similar character in the 11 years to which you have alluded?—The average expenditure was the same over the whole time, but it was much higher ten and eleven years ago.

3468. Did you not say that eight millions included a good deal of ordinary expenditure, which ought to be deducted?—Yes; it includes all the expenditure upon public works, other than interest.

3469. Deducting the ordinary expenditure, the extraordinary expenditure of last year is a good deal less than eight millions, is it not?—Yes, a good deal less.

3470. Is it the fact that the extraordinary expenditure has been materially diminished?—If you include the capital expenditure on the railways, it has been materially diminished.

Sir *George Campbell*—continued.

Colonel *G. Chesney*, R.E.

18 July 1878.

3471. What I understand you to say is, that during the last year the extraordinary expenditure, including the expenditure on guaranteed railways, was nearly seven millions; was not that so?—I made use of the word extraordinary in relation to charges upon public works proper, and excluding military buildings, and so on; the expenditure on public works is seven millions.

3472. You say that four millions is from borrowed money, but does that include money borrowed for the guaranteed lines?—The seven millions includes the charge for guaranteed railways, and the four millions would be borrowed for reproductive works only, excluding guaranteed railways.

3473. Then the four millions, including the money expended on guaranteed railways in the past year, comes to nearly seven millions?—And also the expenditure on irrigation works to be defrayed out of revenue.

3474. Are not some irrigation works now defrayed as extraordinary?—The part that is still included as "Ordinary," is about a quarter of a million sterling.

3475. Still I may assume that the diminution of the extraordinary expenditure, if diminution it be, is nothing like a diminution of eight millions to four millions, inasmuch as to the four millions now expended has to be added the expenditure which still goes on on account of guaranteed railways?—I make out the diminution of expenditure to be from eight and a half millions to about seven millions.

3476. As regards the additional taxation which has been imposed as a famine fund, I think you told us that that money is to be expended on public works, but, in your opinion, a portion of that should not be expended directly upon public works, but should be applied as a sinking fund to sink the capital; what I want to ask you is this: If this fund is to be a fund to provide for famine, in case it is expended upon public works directly or went to a sinking fund, where is the money to come from to pay for the famines, either past famines or famines in the future? For instance, I think I may say that some 14,000,000 *l.* has been expended upon the last two famines; how is that money to be recouped if the receipts are all to be spent upon public works, and not applied to the repayment of famine loans, and how is the expenditure upon the famines in future to be met if, instead of accumulating this money, you have to spend it as fast as you get it?—The assumption, as I understand, in the scheme (I can only speak of what I have seen in the newspapers) is, that the returns from works which will be constructed out of the proceeds of this taxation, will recoup the revenue to the extent of the expenditure; that, of course, is a hypothetical assumption, but if a part were applied to the paying off the debt, then we may argue that to that extent the revenue at the end of the time will be improved or benefited. That money which would otherwise have been spent will then not be spent, and therefore they are then so much better off.

3477. If the money is not applied in paying off the debt at all, then, I understand, there would be no accumulation of a famine fund?—If you do not apply any part to paying off the debt,

Colonel *G. Chesney* R.E.

18 July 1878.

Sir *George Campbell*—continued.

unquestionably there will be no famine fund. But I understood the assumption in the financial statement made by Sir John Strachey to be, that there is virtually an obligatory sum that you must spend upon public works, and if you do not apply the proceeds of taxation in this way you would have borrowed so much more money, and therefore your debts would have been so much more than they would have been otherwise; but I am only giving you my own impression.

3478. In that case, do not you think that it would be better that some public body should keep the accounts separate, so that we should know what is accumulated for famine, and what is spent upon public works; that the two should not be mixed up together, so that we should at the same time be supposed to be saving for famine and expending upon public works, and yet that there should be no account to show what is saved for famine and what is spent upon public works?—Of course, I have only an indirect knowledge of what the scheme is, and I cannot speak positively about it.

3479. As regards a sinking fund, I think you suggest a plan of terminable annuities, but is there any necessity for any system of terminable annuities; is it not quite enough that when a loan is made a calculation should be entered into under which a certain per-centage should be applied to paying off the capital debt without the intervention of any artificial system of terminable annuities such as you have suggested; for instance, is it not now the system under the Indian Public Works Loan Act, that if interest to be charged is 5 per cent., they charge, perhaps, 7 per cent. upon the calculation that the 2 per cent. will have the effect of clearing off the capital in 30 or 40 years?—I think it has this advantage, that though these annuities are purely artificial, still you have made an artificial distinction between one class of debt and the other, and as it is, I think, extremely important to keep the loan operations for public works distinct from other loan operations, I think there is an advantage in creating a different, although it is only a nominally different class of securities; that is, I think, the advantage of annuities.

3480. I think you express a general concurrence in the view that it would be very desirable that there should be some power in the villages and other local bodies to assess themselves for the purpose of works of improvement; I do not know whether you have any acquaintance with the villages of the Punjab; are you aware that there is a machinery of that kind; that the managing committee of the village assess themselves for improvements and for many other purposes, and submit annual accounts which are regularly dealt with under an organised system?—I am aware that in the Punjab the original village communities remain in a much more complete state than in other parts of India; and I should think it would be a great reform if possible to reconstruct the village communities for municipal purposes in all parts of India.

3480*. Would you allow those communities to borrow for the purpose of making useful public works under suitable checks?—I should think that would be desirable.

3481. You are aware that under the present Public Works Loan Act, such borrowing is now possible?—I have understood that it is the case.

Sir *George Campbell*—continued.

3482. You said that at present the moneys raised by local funds, for public improvements, are entirely expended at the discretion of the public officers, and that you think it desirable that the people should have some voice in the management of their own concerns; are you not aware that in form at least, and to some extent in substance, this has been done already, and that almost all the local funds are administered by local bodies in which the people are largely represented?—I am under the impression that that representation is nominal; that those native delegates are almost entirely nominee delegates, and that there is nothing like representation, in the usual sense, in the present local communities; but I admit that a beginning has been made, and, so far as it goes, a good beginning.

3483. The principle has always been acknowledged; it only remains to carry it out efficiently?—Yes.

3484. With respect to Roorkee College, I have been very much struck by your statement regarding the native students there, which I understand to be this, that every possible encouragement has been given by the Government to native students to resort to Roorkee, that not only is a gratuitous education given, but that large stipends, in fact I may say, taking the value of money in India, very large stipends are offered by the Government to any students who will avail themselves of that institution; and further, you say that the students who qualify themselves at that institution are secure of Government employment, on extremely liberal terms, because you have told us that they are to commence upon 250 rupees a month, that is 300*l.* a year, which, comparing the value of money in this country, I think I may assume to be equal to at least 1,500*l.* a year in this country; but notwithstanding all these enormous advantages of gratuitous education, and handsome stipends, and most liberal public employment, the Government have not been able to obtain as many native students as they wish to obtain. If I have correctly stated the purport of your evidence, can you explain to us the cause of such an extraordinary result; seeing that we know that natives are not deficient in intellectual capacity to successfuly compete for appointments in the civil department, and in other departments of the public service, how is it that there is such an extraordinary holding back from the opportunities which the Government afford to them of entering the Department of Public Works?—I should wish first to make one correction in what I said before. Until a few years ago native students from Roorkee were admitted as third class assistants, on 250 rupees a month, and at that time the number of scholarships available was never filled up. Now the Roorkee students are obliged, in the first instance, to enter as what are called engineer apprentices, on a still smaller salary, but they are eligible for promotion from the grade of apprentice to third class assistants at the pleasure of the Government; and the practice has been, I believe, in a few months always to promote them. Since that reduction in reference to the salary given on first appointment to the service, there appears to have been an increase in the number of students coming forward, and I believe

Sir *George Campbell*—continued.

believe that now those six scholarships are always taken up. What the reason may be for the slackness of the competition for this highly paid branch of the public service, it is very difficult to say. I can only ascribe it, so far as I am aware, to a general feeling of disinclination on the part of the educated classes, who have been principally the products of our colleges, to the active and practical character of the engineering profession.

3485. Then I think you said that you would remedy that by going to what you called a lower stratum; when you say a lower stratum, do you mean people who are socially lower, or what do you mean, because is it not the case that the better classes of the agriculturists, I may say the higher agricultural castes, are physically strong and intellectually capable of education?—I would like to see the same class educated at Roorkee that is educated there now in what is called the vernacular classes, only that the education should certainly be in English. I think that the circumstance that a native subordinate now only speaks the vernacular, and that an European engineer speaks the vernacular as a rule very imperfectly if at all, tends to keep the two classes very much asunder, and that if a native were educated in English, he would be on far better terms with the European engineer than he is now. That class, I conceive, would make very useful public servants. It is as you say, a robust class, and an intelligent class, but they have now the misfortune of getting a very imperfect engineering education.

3486. Can you explain in general terms from what class the English-speaking engineering students are drawn, and from what class the vernacular students are drawn; are the vernacular students boys of the artizan class, or what are they?—They come in almost every case from the district schools, and I should suppose that they are many of them the children of agriculturists or small tradesmen, and that the class which comes up for the European Department are generally the children of English-speaking natives themselves, clerks in public offices very frequently.

3487. But is it the case that the English-speaking natives as a rule come from the higher stratum of society, from a native point of view?—No, I should correct what I said about the higher stratum. I should rather have said an educationally different stratum. I apprehend that the vernacular classes come from quite as respectable a class as the English-speaking students.

3488. Is there a larger proportion of the vernacular-speaking classes in the North West Provinces than in the other provinces?—I am not able to say.

3489. You have told us your views as regards the relative position of Europeans and natives in those countries, but there is a large class of East Indians, is there not; and what would be your view with regard to educating them for the public service?—There are some East Indians now both in the junior and the senior departments of Roorkee College. It is of course very difficult to make any rule for natives that would not be applicable to East Indians, and I think that the latter should have the same advantages as the natives.

3490. If the Europeans, the sons of officers

Sir *George Campbell*—continued.

Colonel *G. Chesney*, R.E.

18 July 1878.

living in the Himalayas, and being in fact, natives of the country, choose to qualify in the same form as natives, I suppose you cannot exclude them?—Certainly not; but they would not be willing to come forward for a subordinate position.

3491. But would they not be willing to come forward on the terms on which employment is now offered to the students at Roorkee?—They do come forward; that is the class which principally supplies the department from Roorkee.

3492. Then am I to understand that you would wish to cease to offer employment in the first instance of so high a grade as is now offered to the Roorkee students, and would confine their employment to the lower grade?—I think so, because unless the expense of the Roorkee is considerably increased, and the staff very largely augmented, it would be impossible to train both departments satisfactorily. I think that the energy of the staff should be given to the native classes, and that if the European class is kept up, it should be on the footing that they contribute to the expenses of the place an amount sufficient to defray the cost of the extra staff needed, and it is not at all likely that they would be ready to do that.

3493. At present I understand that the stipend of 250 rupees a month is given to native students, but then there arises the question as to who is to be considered a native; is an East Indian eligible for that stipend?—I think not. I have no recollection of any but natives coming up for it.

3494. As regards the higher classes, would you advocate the putting of Europeans and natives upon the same footing?—I would admit a European if he was willing to come in upon the terms proposed, but I apprehend that none would be ready to come forward.

3495. Would you exact the same terms from natives, or would you maintain a system under which the European should maintain himself, and the native should be aided by the Government stipend?—I should be glad to see European agency gradually discontinued in all the subordinate branches of the department, except perhaps at European stations; and therefore I see no reason to maintain any special advantages for Europeans in those colleges in India.

3496. Then am I to understand that you would wish to educate a large number of natives for the engineering departments, who should commence their service in a lower grade of the service than they now do, if educated in the English department at Roorkee?—Yes; I would not consider them necessarily as a subordinate department, but on a lower paid scale, certainly.

3497. You have told us that you would like to do away altogether with the European subordinate department; quite accepting all you have told us of the difficulties, temptations, and evils attending that system, is it, in your opinion, the case, or is it not, that there are certain classes of hard tasks, as it were, in the subordinate branches of the Public Works Department, which require a certain amount of the European energy and go, which there has hitherto been a difficulty in getting natives to undertake, and which the superior energy of Europeans, even drunken as

Colonel *C. Chesney*, R.E. 18 July 1878.

Sir *George Campbell*—continued.

they may be, has been more effective in accomplishing?—I would still continue to maintain European subordinates at European stations, where they have the fellowship of Europeans of the same class with themselves and personal supervision; but admitting the exceptional advantages that the Europeans would bring of education, and so on, I think that the disadvantages far outweigh the advantages of keeping them up.

3498. Still, looking at what you have told us of the repugnance of the natives to the Public Works branch of the service, do you think that the hard and severe work which is now performed by the European subordinates would be safely and effectively performed by the natives, in case your plan were carried out?—The change must be gradual; the educating and training of a native service must be a gradual process.

3499. As regards the native colleges, other than Roorkee, I think you told us that you were at one time head of the Calcutta Engineering College; will you tell us when that was?—In 1859 and 1860.

3500. And had you any assistants at that time?—The staff consisted of myself, a professor of mathematics, and an instructor in surveying (who was also very fully engaged in the revenue survey, at the same time that he gave part of his services to us); subsequently a young officer of Engineers was appointed as my assistant, and a drawing master was also appointed to teach geometrical drawing, who had never had any practice in geometrical drawing before, but he was the only person available, and a most excellent person he was too; but that constituted the staff of the college.

3501. But, with the deficiency of this drawing master excepted, do not you think that that was a very efficient staff?—No, I think it was quite inefficient. I should add, that during half my time I was also saddled with the duty of Examiner of Acounts for Bengal, in addition to the control and management of the college, and all the engineering teaching.

3502. You told us, did you not, that at the colleges in this country other than Cooper's Hill, the staff is somewhat of the character which you have described as existing in the native colleges in India?—Yes, and the result of it is that at no college that I am aware of, is there anything deserving the name of an engineering education given.

3503. Still the engineering colleges of Calcutta and Madras may be fairly compared with any existing in this country, Cooper's Hill excepted?—Perhaps so; but I may state that engineering education has made a great stride during the last few years, and we are now more nearly approaching the condition of the continental colleges, which we were far behind.

3504. Is there not some difficulty about the pension system of civil engineers at present; you said that the elderly men, who had entered the service late in life, were not qualified for a pension; as regards the Cooper's Hill student, is not that a great difficulty, inasmuch as the only pension rules provided for him are the general rules of the uncovenanted service, which rather contemplate natives who are likely to remain in the service for life; and is it not the case that without a sick certificate a man must serve a very long time before he can obtain a pension, and

Sir *George Campbell*—continued.

that it is only upon a sick certificate that a man can retire after a moderate service?—The present pension rules for what are called uncovenanted Europeans are really quite inapplicable to their circumstances; they are a sort of relic of olden times, and will necessarily have to be entirely revised before long. The Government has not yet faced the question, but they will have to do so.

3505. At present the pension rules for civil engineers, you think, are inapplicable to the conditions of the case?—Yes.

3506. As regards the Royal Engineers, I think you told us that more than half of the junior officers of the Royal Engineer Corps, you think, are employed in India?—Yes; nine battalions are employed in India against seven at home.

3507. Is it within your knowledge that that system was adopted by a deliberate resolve of the Government in which the Indian Department took share; or how did it come about?—It was a part of the general result of the amalgamation of the two armies, so that the engineers from the Royal Engineers Corps was then largely augmented for the Indian service.

3508. Did the Government of India ever express an opinion that it was desirable that the Corps of Royal Engineers should be augmented for the India service upon the terms upon which they now serve?—Yes, it was done distinctly in consequence of the proposal, or, rather, the urgent demand of the India Government.

3509. Was that before or after the Cooper's Hill College was established?—I think just before.

3510. Was it a determination come to in view of the establishment at the same time of the Cooper's Hill College?—I do not know that the two questions arose in connection with each other. There was a demand made for engineers of any kind, and amongst other ways of increasing the department the augmentation of the Royal Engineers was employed.

3511. Looking to your personal experience, and to the present position of Roorkee College, do you think it was a wise determination to increase the number of Royal Engineers to such a degree that more than half of the young engineers should serve in India?—That is a question which may be regarded from a great many points of view. From a military point of view it is, perhaps, undesirable to have too large a proportion of officers employed in civil duties. From a public works point of view the Government were of opinion that their military engineers were a very valuable element of the service, and that it was very desirable that a considerable proportion of the whole staff should be military engineers.

3512. Is that your own opinion?—Yes, although perhaps I do not go so far as many of my brother officers. I do not think that the majority of the officers of the department should be military. To effect this would have involved such a large augmentation of the corps as would have resulted in their superseding the rest of the army, which would have been very undesirable.

3513. Do you think it is good for the Public Works Department that it should have a certain number of young officers quartered upon the department, who are in the first part of their service entirely ignorant of the language, and who, after a service of seven years, when they have become

Sir *George Campbell*—continued.

become to some degree qualified, are liable to be withdrawn at the pleasure of the military authorities?—They are not more ignorant of the language than anybody else who goes out in the first instance, or very little more so. The condition about their returning home at the end of seven years I believe is practically a dead letter, although they are not so permanently in India as the old Indian engineers were. One great advantage attending the employment of Royal Engineers is, that if their health fails in India they can exchange for home service. The Civil Engineer, on the other hand, has no corresponding position to fall back upon.

3514. Are the young civil engineers not required to qualify, to a certain extent, in the language?—They are instructed in Hindustani at Cooper's Hill. It is a great pity, I think, that the study of Hindustani has been abolished at Woolwich.

3515. Do you think that the young engineer officers employed in the Public Works Department in India are themselves contented with their position?—I think so.

3516. But is their position in the corps such that if they desire to spend their lives in India, they may become practically permanent officers of the Indian Public Works Department?—They are practically on the same footing as the other officers of the old Indian regiments.

3517. Is it permitted to them, without loss of position in their own corps, to spend their lives in India in the Public Works Department?—Yes, apparently so; the amalgamation took place 16 years ago, and a considerable number of officers have been employed in India ever since.

3518. Are there now a large number of officers who have been more than seven years in the Public Works Department?—A very large number.

3519. I think you went so far as to say that in your opinion navigation is almost incompatible with an irrigation canal; have you any knowledge of the irrigation which goes on upon the Godavery canals, which are also used for navigation?—I have only a hearsay knowledge of it, but I must observe that these returns of the quantity of navigation may possibly be misleading; the impression conveyed depends entirely on what you consider the unit of navigation. I remember a few years ago seeing an account of the navigation on the Upper Godavery; it was a long report to show that there were 50,000 tons of navigation a year. I was aware, as a matter of fact, that navigation did not exist on that line, and I was unable to reconcile this statement with the facts which I was well aware of; but in looking over this report again, I saw in a small foot-note, in very small print, "50,000 tons, that is to say, 100 tons carried 500 miles, or 50,000 tons carried one mile," or figures to that effect, and the unit of 50,000 tons being adopted in that way, it was then carried through the whole report. Now the only navigation on those works was the navigation to convey food and tools to the workmen, so that these returns may be misleading.

3520. There is one very important question which I omitted to ask you, and that is this: your opinion is that the native students should enter the Public Works Department upon lower pay than they now do; what system of promotion would you adopt; when once they had

Sir *George Campbell*—continued.

Colonel *G. Chesney*, R.E.

18 July 1878.

attained the grade of third class assistant engineer, would you consider them eligible to rise, and would you ordinarily promote them, *pari passu*, with the European engineers who had entered that grade, or would you have any system under which there should be some selection before you promote them to the higher grades?—I should observe, as I have already said, that I think they should enter generally on lower rates of pay than are now given to the native engineers, but that the natives generally should have better pay than they have now. I think what are called the lower subordinates are not paid nearly well enough. I would, in fact, entirely revise and re-cast the whole system of native payment. But, in the first instance, no doubt the highest normal condition of a native engineer should be that of assistant engineer; that is the highest post he should get, and I would gradually replace the European assistants to a large extent by natives; then those who showed capacity should be made executive engineers.

3521. Am I to understand that having obtained the grade of assistant engineer, you would not promote them to the higher grades upon the same footing, or with the same rapidity as you would promote the European assistant engineers, and that the promotion of natives to the higher grades should be a matter of selection, and not a matter of routine?—Yes.

3522. Whereas, as regards European engineers, having taken sufficient precaution that they are adequately qualified, they would be promoted as a rule, and that non-promotion would be the exception?—Certainly; but I have not the least doubt that if the system is once established, the promotions of native engineers would go on quite as fast as their deserts; I think there is every desire to give them their proper place, but hitherto, so far as promotion is concerned, they have not got on well. There is one case of a distinguished engineer in the service out of a large number who entered, who occupies the position of first-class executive engineer, and he is a man of very great scientific acquirements, and an excellent officer, but that is a very solitary exception.

3523. Still supposing there are a certain number of European assistant engineers, and a certain number of native assistant engineers, you think that the deserts of the latter class would not ordinarily justify their promotion to the higher grades so rapidly as Europeans would be promoted?—I think as things are at present, certainly not.

Mr. *Ashbury*.

3524. I suppose, during the last 20 years, all public works, as a general rule, all railways, all canals, and all barracks have been supervised by Europeans, and not by natives?—Yes.

3525. I think I understood you to say, that as a general rule, the natives were not very *au fait* in engineering?—They have not shown, I think, any marked capacity for engineering, but there is a great quantity of undeveloped talent in every branch of life in India; but it is only to be got at by going to work in the right way.

3526. As a general rule, I take it that it would not be politic to employ natives as chief engineers, for the purpose of supervising important works, especially where that involves giving out contracts?—I hope the time may come when we

Colonel *G. Chesney*, R.E.

18 July 1878.

Mr. *Ashbury*—continued.

shall see native chief engineers; the time has not yet come I think, but I quite believe in the possibility of educating them up to the point of making them very good chief engineers.

3527. But at the present moment it would be rather a dangerous innovation, would it not, to employ natives to superintend public works on a large scale as a general rule?—Certainly; the change must be very slow and gradual, I think.

3528. But it would be very much to the public interest if the natives could be selected and employed as assistant engineers?—I would begin by employing them in that way, and gradually advance them as they deserve it.

3529. But as a general principle, apart from their engineering knowledge, it would be rather a dangerous innovation, would it not, to give natives the power of giving out contracts and executing contracts?—We have already some natives in the position of executive engineers, and they have precisely the same power and authority as European engineers similarly situated. The native I am speaking of who occupies a conspicuous position in the Punjab as engineer has the same power of giving out contracts as a European officer.

3530. I daresay you are aware that in Europe in connection with public works, it has been the rule (I do not say the general rule), to give engineers commissions upon works executed; have you any knowledge of such commissions having been given to native engineers?—There is no reason to suppose that anything of that kind has been done, so far as I am aware.

Mr. *Hardcastle.*

3531. With regard to Roorkee, I understand you to say that the native students at Roorkee receive payment from the Government while they are at college?—Yes, at different rates according to the division or class that they are serving in.

3532. At Cooper's Hill, on the contrary, the students pay their own expenses?—Nearly all. There is a deficit of about 800 *l.* a year on the annual expenses.

3533. Can you tell me what is the usual expenditure of a young man at Cooper's Hill?—His fees are 150 *l.* a year; and I suppose his expenses are 50 *l.* or 60 *l.* more.

3534. Do you mean for his clothes, pocket money, and so on?—Yes.

3535. Then I understand you to say that the native engineer, according to his grade, receives the same pay as the European engineer?—Yes.

3536. That is to say, the native who is entirely educated at the expense of the Government, and also is paid this stipend, greater or less, is placed in exactly the same position as the European officer who is educated at an expense to himself of some 200 *l.* a year?—Yes, but with this difference, that the native enters on the lower grade, and when he is promoted to the higher grade the assumption then is that he is as qualified as the Europeans who begin on the higher grade.

3537. But I understand you to say, although they have a lower grade, the European officer's education takes three years, and a native's only one and a half?—Yes; but then the natives enter

Mr. *Hardcastle*—continued.

on a lower grade, and will not get promotion to the other grade for one or two or more years.

3538. But during those one or two years, at all events, during a year and a half, the European student is spending his 200 *l.* a year or more, at Cooper's Hill?—Yes, and the other is receiving salary.

3539. Therefore the native has, in point of fact, a very great pecuniary advantage over the European?—At first starting a very great advantage.

3540. In fact, is there not within your knowledge any other establishment in which persons educated entirely at the expense of the Government receive the same pay as those who are educated at their own expense?—I think that the arrangements in India have been peculiarly liberal towards the natives, especially in the Public Works Department generally, in giving them a gratuitous education, and then Government appointments.

3541. As regards the necessary expenditure of a native in India as compared with that of a European, would not a salary say of 250 rupees a month be very much larger, practically, in the case of a native than it would be in the case of a European?—I think so; I think that the sort of salaries which natives should receive should be the salary that Europeans would receive in their own country and not what they receive in India. You give a man in India, say 500 *l.* a year for certain duties, and you may get in England an equally good man perhaps for a couple of guineas a week; and that lower rate seems to me to measure the proper rate of remuneration for the natives of India.

3542. With reference to a totally different subject, namely, the use of steam power on canals. you seem to refer to the use of large steam vessels?—Large steam vessels could not be employed upon most of our caaals; the locks are two small.

3543. Are you not aware that on the narrow English canals, for instance, the canal between Birmingham and London, steam barges are used, and the greater part of the service is done by steam barges?—I was not aware that that was the case.

Mr. *Onslow.*

3544. On that point your idea is, that if steamers were employed on those canals, you would have to construct the canals very much stronger than they are at the present time, and therefore they would cost a great deal more per mile than what they have cost already?—It would involve a very large expenditure to secure the banks against the wash.

3545. You have had more experience in railways than in irrigation in India, have you not?—I have had no direct experience in railways beyond what has been derived from my official connection with the accounts of them.

3546. Have you ever considered the propriety of having throughout India a scheme for light railways, first as regards opening out the country, what I may call tapping the country, those light railways becoming feeders to the main lines; and secondly, as regards their utility in carrying grain to famine-stricken districts?—The greater part of Upper India is peculiarly favourable for the

Mr. *Onslow*—continued.

the construction of light railways, bein g perfectly flat, and having a very moderate w aterway to cross; most of the trunk roads in Up per India I believe may be adapted at a very m oderate expense for light railways; and that is being done in fact at the present day, I understan d.

3547. You wo uld recommend, at all events, so far as Upper India is concerned, that the system of light railways should be very much extended?—I would.

3548. And as regards other par ts of India of which you have had experienc e, what would your advice be?—That wherever a case arises now for opening up new communications, a preference should be given to light and cheap railways over either more expensive railways or common roads if possible.

3549. We have heard it often stated that 7 per cent. would be a fair return for money expended on irrigation works; do you think that on light railways we could even expect to get a return as good as that, or would the return in your opinion be better?—It is almost impossible to give a reliable opinion upon that point, I think. We know that the more railways are developed the greater the returns will be on the existing lines; and I think that the great return must be looked for in the development which the construction of numerous light feeding lines would give to the main trunk lines; but that those light lines themselves would pay 7 per cent. I should be disposed to think was unlikely.

3550. As regards famines, would those light lines which you recommend be sufficiently strong to carry a great amount of food to the districts in which there was a famine?—I think they would be able to carry enough, at all events, more than upon any common road; but whether they would carry what would be required for every conceivable intensity of famine it is almost impossible to say beforehand.

3551. Still that would be far superior to the present mode of transit?—Unquestionably.

3552. You have told us that the present engineering staff in India is very expensive, and you have recommended that that expense should be diminished by a larger employment of natives; but if that were to be the case, you would have to pay those natives a great deal less than the present pay of European engineers?—Yes, certainly.

3553. Not only would you have to pay them less, but their pensions would have to be less?—Yes. What I think is, that it will become eventually necessary to increase the pensions of European officers very much above the present rates, and that the present rates are quite sufficient for people living in the country, but they are not sufficient to induce people to leave the country and come back to England.

3554. You have compared the system which you would adopt to the system which is now in operation in the native army; in native regiments you have not seven European officers, and you have what I may call middlemen, namely, native officers between the English officers and the privates in these regiments; do I understand you to say that you would recommend that system for the Engineer Department in India?—Something analogous to that.

3555. Up to what class would you recommend

Mr. *Onslow*—continued.

Colonel *G. Chesney* R.E.

18 July 1878.

that the natives, according to your system, should arrive; you are aware that no native officer now can be adjutant or quartermaster, or wing officer, or can command a regiment; therefore the promotion of a native engineer officer, according to your system, would have to stop at a certain mark; what would that mark be?—I should say that I hope the day will come when we shall see natives as adjutants of regiments, and even commanding regiments in exceptional cases; and in the same way I would consider the normal position of a native to be that of an assistant; he should occupy an analogous position to that of a native officer in a native regiment; but in all cases of proved merit he should be eligible for promotion to any post in the department.

3556. Of course, holding that view, you would not limit the class of appointment to which a native engineer officer should arrive at the present time?—Certainly not.

3557. Neither as an executive officer nor as a superintending officer, nor in any department of Public Works under the Government of India, or any other government?—I would consider him eligible for every thing, as indeed he is at present.

3558. For the secretariat and executive offices?—Yes; but I would not force them on before they were fit for it. I think that the work of raising their position must be a gradual one.

3559. Have you ever considered the propriety of holding out inducements to natives to enter the college at Cooper's Hill?—No; I confess I do not see my way to hold out such inducements. To do that very special advantages must be given to them over other British subjects. Their expenses must be paid, and they must receive a stipend whilst they are there. And after all, you cannot always put a native in the same position as a European. I would much rather see the natives rise in the public service from some subordinate position by his own merits and in a really natural way.

3560. You would not advocate a system of scholarships the examination for which should be held in India for natives who would choose to come over to Cooper's Hill to be educated?—As a matter of sentiment and feeling that might be a very desirable thing to do; but the objections, I think, would be that you would get the wrong class of natives, because a native who can pass an examination is not always the man that you want for an engineer.

3561. As regards the Royal Engineer officers who go out to India, they go out with a superior education, and for which India has paid nothing at all? — I believe with regard to the cost of their education, India contributes towards the cost of the English army, and in that cost the preparation of young engineer officers is included. I have no positive information upon that point, but I believe it is the case.

Mr. *Fawcett.*

3562. A portion of the general army establishment charges in England is borne by India, and therefore a portion of the expense of educating those young engineer officers is borne by India?—I believe that is the case.

Mr. *Onslow.*

3563. You are aware of the system now in

Colonel *G. Chesney*, R.E.

18 July 1878.

Mr. *Onslow*—continued.

force in India as regards the local governments and the Supreme Government, and the amount which the local governments are allowed to spend on public works. I think I am right in saying that they cannot spend on any public work without the sanction of the Supreme Government, more than a lac of rupees, or 10,000 *l.*?—I think that is the limit.

3564. Did you have any particular experience upon that point when you were in India?—Yes, I saw the practical working of the thing.

3565. In your opinion, do you think that the local governments should be allowed to spend more money than that 10,000 *l.* in any particular work without any communication to the Supreme Government, or do you think you would bind them down, as at present, to 10,000 *l.*?—I think there is no particular virtue in that special limit; but I think there is a great advantage in requiring the case to be put before the Supreme Government. I think that that involves the local government going into a scheme much more carefully than they might be likely to do if they had no sort of criticism to bear upon it. And in the same way the having to submit all large schemes from India to the Secretary of State unquestionably puts the Government of India upon its mettle to make out a good case and to see that the scheme is a good one before it is sent home. I think that those rules lead to the rejection very often of undesirable projects.

Mr. *Fawcett.*

3566. As to your proposal about a sinking fund for the purpose of the recent new taxes which are imposed in India, and which are devoted to the purpose you propose, it would virtually limit the amount that the Government would be able to spend upon public works, would it not?—The amount of the proposed taxation would give a sinking fund, if applied every year to that purpose, sufficient, if redeemable in 50 years, to enable 8,000,000 *l.* a year to be spent on public works, which is, I should say, very much more than ought to be spent.

3567. But then that supposes that you are going to devote the whole of this increase?—Yes.

3568. But then the original object for which this new taxation has been imposed would not be at all attained, because it was said to be a fund wherewith to provide a reserve to meet the famines which were supposed to occur in India about every five years; it could only be looked upon, and would be looked upon as an indirect reserve and not a direct reserve?—I infer that that is the case.

3569. As I understand your proposal, you would re-organise the Public Works Department on the model of the native army, where, as I understand, the line of demarcation between the positions in native regiments which are held by natives and Europeans is so well marked that it is scarcely, if ever, passed; you would not, in the Public Works Department, maintain so absolute a line of division between the appointments to be held by natives and Europeans?—Certainly not. The line of division could never occur in that stringent way in the Public Works Department, because there are already natives serving in it as executive engineers; so that the precedent for their advancement has already been established.

Mr. *Fawcett*—continued.

3570. And you would certainly in no way diminish the means of access which natives possess to the highest appointments in the Public Works Department at the present time, but rather increase them under what you consider proper regulation?—Certainly. I only use the analogy of the army in a very rough way to press the argument for providing sufficient promotion for the European engineers, by preserving a proper proportion between the higher and lower grades. One should not swamp the department with too many European assistants.

3571. You think, judging from your experience of the past as regards the employment of natives, when they are properly qualified, there is no disadvantage in employing them in the highest positions in the Public Works Department?—When properly qualified, certainly not.

3572. And that you even base upon the few who hold those positions at the present time?—Yes.

3573. Is your entrance examination to Cooper's Hill College *vivâ voce* at all?—To some extent.

3574. In order to encourage a superior class of natives to come to England to study in your college, would you see any objection, supposing by voluntary effort three or four scholarships were raised upon the understanding that they were to be held by natives at Cooper's Hill, which would supply maintenance to any young natives that were educated there, that they should be allowed to come if they were examined in India, and had passed precisely the same examination as your students pass at Cooper's Hill, because you might send over sealed examination papers in the same way as they do now send the Oxford and Cambridge Local Examination Papers all over the world?—There is this difficulty, that immediately applications would be made to have examinations held in all parts of the world, in Canada and Australia, and so on. We had an application not long ago from Canada to have the papers sent to them.

3575. But still there would be a stronger case for India?—Certainly, there would be.

3576. And you might, under certain circumstances it seems to me, grant that to the natives of India?—I think in the special case referred to of scholarships founded from private sources that would be unobjectionable, but to have an unlimited competition for Cooper's Hill, in which the examination should be held in India, would tend to perfectly swamp Cooper's Hill with natives.

3577. But there would be no difficulty whatever with regard to determining that the tests which they passed should be precisely the same?—None, whatever; we have had one native already at Cooper's Hill College, who was supported by a scholarship in India.

3578. But that difficulty is, as it seems to me, always one of the chief grievances which the natives have to complain of, that not only have they to come to England (and you might say the people of

Mr. *Fawcett*—continued.

of Canada might do the same), but that they are not certain when they arrive there that they will obtain an appointment, so that the expense of their journey may be thrown away?—In that case there is a great drawback to the native of India.

3579. The scheme that I suggest would entirely remove that grievance of which I know there have been some complaints, would it not?—Quite so; with those conditions I think it would be a very good arrangement.

3580. I wish to put to you one general financial question; you said that you agreed generally with the evidence of, I think, General Dickens and Colonel Crofton, about allocating a certain amount of money each year for the public works expenditure in India; that was your general conclusion, was it not?—I am very strongly of opinion that whatever the grant be, it should be maintained at a fixed amount from year to year for a considerable period of time. Nothing tends to greater waste in the expenditure of public works money than sudden fluctuations, either reductions or increases.

3581. But admitting, as I am bound to do, the serious loss and inconvenience from whatever point of view, of varying any expenditure from year to year, yet there is something of great moment, is there not, to be urged on the other side; that is to say, you must adjust the expenditure, must you not, in relation to the financial condition of India?—Only I would rather make the adjustment prospective; that is to say, if I saw a deficit this year, I would agree to reduce the expenditure next year, or the year after that, but not instantaneously.

3582. The point which I want to bring out is this, that although it may be judicious to say that in the present financial condition of India, 4,000,000 *l.* or 5,000,000 *l.* a year ought to be spent on public works; yet you can conceive it quite possible that in three years time, supposing some untoward event should happen, such for instance, as a great depreciation in the value of silver, if a burden were thrown upon the finances of India by some event like that, it would be necessary, although it may not be done instantaneously, at once to re-adjust the amount which ought to be devoted to public works?—I think that the amount available for public works must be determined by the conditions of the case. If those conditions vary, the amount allotted must be open to reconsideration.

3583. When you say the conditions of the case, you would give as I understand, a prominent position to the financial condition of India?—That would be one of the most important conditions.

3584. And therefore you cannot separate in any way, because the two are inseparately associated, the Public Works Expenditure and the general financial condition of India?—The two must be regarded from one point of view, no doubt.

3585. Is there not a disadvantage in having so large a proportion of military officers employed in civil work, as I understand you still contemplate in India, that in the case of a military emergency all those officers, or a great proportion of them, might be suddenly drawn away, and therefore you are not sure of their continuous

Mr. *Fawcett*—continued.

Colonel *G. Chesney*, R.E.

18 July 1878.

services in the same way as you are of the continuous service of civilians?—If a great emergency were to arrive, the fact that you have a staff of military officers would, I think, be in one point of view extremely useful, because they could be employed in a military capacity just at a time when public works would be slackened, if not suspended altogether. On the other hand, it must be observed that in the Mutiny, which was perhaps as great a crisis as is ever likely to arise, less than one-half of the military officers of the Public Works Department were employed on military duty. Therefore I think the case is hardly conceivable of the department being upset by the demand.

3586. I do not know whether you have expressed an opinion upon the subject, but in the proposed reorganisation of the Public Works Department, such as you have suggested, what do you think would be the annual number of appointments from Cooper's Hill; is it possible to make any calculation upon that subject?—It would be very difficult to say; I apprehend there would be a gradual reduction in the number of men sent out from the college.

3587. Say 15 or 20 possibly?—Possibly, that might be fairly the minimum.

3588. You think there would be no difficulty whatever in filling up the college, if it was in this way denuded of a portion of its students by young engineers, who would not necessarily be employed in India?—I think not, because already we have had several applications from candidates for admission, not intending to go to India, but merely desiring the education of the college, which we have not been able to act upon.

3589. In this way it could not be alleged as an objection to your scheme that, whereas Cooper's Hill now costs India very little, if your scheme were carried out it would throw an increased burden upon India, in consequence of Cooper's Hill not paying, because those students might make up any loss that would otherwise be incurred?—Yes; but I would add that, even supposing 25 years hence Cooper's Hill became a loss, still it would have done its work.

3590. Have you made any estimate roughly (so as to show the advantage of your scheme) of what the present administrative charge, or the present departmental charge of the Public Works Department is in India, and what it would be if reorganised, as you propose?—I have not. The first thing is to get public opinion ripe for the change; and moreover, the great charge involved in the present system, as it seems to me, is one that is, so to speak, a prospective charge, for increasing the rate of promotion, and for the improved pensions which would have to be given unless some change of organisation is adopted.

3591. So that really we do not know what is the expense to the Public Works Department at the present time, because with its present organisation you are landed as it were in a cleft stick; you either have the thing blocked up by Europeans continuing in India when they ought to leave, or in order to get them to go, you must be prepared to spend a greater amount in pensions?—That is the case, I think.

3592. Still

Colonel *G. Chesney*, R.E.

18 July 1878.

Mr. *Fawcett*—continued.

3592. Still you think the saving would be very considerable?—I think so certainly.

3593. You say that you think that in order to carry out these reforms which you propose, it would be necessary to influence public opinion; where do you think that the change of public opinion is to be; in England or in India?—I mean by public opinion, general official opinion in India.

3594. But your scheme would be the reverse of unpopular, you think, with the people of India?—With the officers, I should think, it would be at first sight unpopular, that is to say, with European officials, who would prefer to have Europeans under them.

Mr. *Fawcett*—continued.

3595. But with the people of India you would think it would be popular?—Unquestionably, I should think, so far as I know Indian opinion at all.

3596. Therefore you think that the chief persons to influence in getting them to look at it favourably would be the English officials in India? — The great mass of Anlgo-Indian officials.

Thursday, 25th July 1878.

MEMBERS PRESENT:

Mr. Agnew.	Mr. Fawcett.
Mr. Ashbury.	Lord George Hamilton.
Mr. Balfour.	Mr. Hardcastle.
Sir George Campbell.	Mr. Sampson Lloyd.
Mr. Childers.	Sir Joseph M'Kenna.
Mr. John Cross.	Mr. Onslow.
Mr. Grant Duff.	Mr. Edward Stanhope.

LORD GEORGE HAMILTON, IN THE CHAIR.

Colonel JOHN FREDERICK FISCHER, R.E., called in; and Examined.

Sir *George Campbell.*

3597. YOU are an Officer of the Royal Engineers of Madras, are you not?—Yes.

3598. Will you have the goodness to state to the Committee what your service and employment in India has been?—I arrived in Madras in February 1850, and did military duty until May 1851. I then joined the Godavery works under Sir Arthur Cotton, and remained connected with those works until 1856.

3599. Do you mean the Lower Godavery or the Upper Godavery?—The delta of the Godavery, the Lower Godavery. I then was appointed to take charge of the Bellary district, and remained there, with the exception of a short furlough to England, until October 1864, when Sir William Denison appointed me to take charge of the Public Works Accounts of Madras. In 1867 I went to the Central Provinces for irrigation works, and returned to my own Presidency in March 1869, when Lord Napier appointed me to take charge of the Lower Godavery works again; and I remained there until 1874, when I was in charge of the Madura district, and I came home last year, August 1877, on sick leave.

3600. Were you not employed on the survey of a great reservoir scheme?—I have had to look after several reservoir schemes.

3601. We have heard of a grand reservoir scheme 1,600 feet above the level of the sea, from which all India was to be irrigated; do you know anything about that?—That is the reservoir scheme which I proposed for Bellary; although I did not actually survey the whole of it, I took the levels and proposed it.

3602. When was that?—In 1857-8.

3603. Have you done anything recently towards that scheme?—Yes, I had that matter again brought to my notice, and if the Committee wish it I will go into the history of it; I had gone into that matter in 1857-8, and also recently.

Sir *Joseph M'Kenna.*

3604. What was that scheme?—That was a scheme for a large reservoir across the Toongabuddra river, in the Bellary district.

Sir *George Campbell.*

3605. It is the same scheme which Sir Arthur Cotton referred to as a great reservoir 1,600 feet high, from which canals are to be carried out to irrigate all India?—Yes, 1,600 feet above the level of the sea; but not to irrigate all India.

3606. When you were employed in the Bellary district, and again in the Madura district, was it in the capacity of district executive engineer?—District engineer in charge of all the works.

3607. Has a district engineer in Madras charge of all works of every kind, or specially of works connected with agriculture?—Of everything; military buildings, civil buildings, roads, and canals; in fact, of all except railways, which belong to a different department.

3608. But I suppose in Madras the irrigation works are a very large portion of the charge of the district engineer, are they not?—That depends upon the district which you happen to be in. Bellary had a great many tanks in it, and very large tanks.

3609. Is Madura also a district with irrigation works?—There are an immense number of tanks; I may say thousands of tanks in Madura, but a very large number of them belong to the zemindars; nearly half of the district is zemindary.

3610. Will you explain to the Committee the system under which the tanks are managed in the Madras Presidency, and, so far as you have a knowledge of it, how far the tanks are managed by the Engineer Department, how far by the zemindars or villagers; and, with respect to the distribution of water, how far that is under the charge of the Engineer Department; and again with regard to the assessment and collection of revenue, how far that is under the charge of the Engineer Department?—When the Public Works were re-organised in 1855 and 1856 the repair of the Government tanks was put entirely under the engineer officers.

3611. Will you first explain which are the Government tanks, and which are the tanks which are not Government tanks?—The tanks that belong to the zemindars are those which do not come under the Government; they are not bound to maintain them.

Colonel *Fischer*, R.E.

25 July 1878.

Sir *George Campbell*—continued.

3612. How do you use the term zemindars; do you apply it to the large zemindars as distinguished from small proprietors?—I mean all proprietors independent of the Government.

3613. What I should like to understand is what proportion of the tanks are treated as Government tanks, and what proportion are in the hands of the zemindars, large or small, or village communities, as the case may be?—In the Bellary district all the tanks belong to the Government.

3614. Are there no small tanks?—There may be some small tanks, but the zemindaries are excessively small. The Sundore rajah has a very small extent of country, principally formed of the Rahmandroog Hills.

3615. Are there no small tanks kept up by village communities without the interference of the Irrigation Department?—The Government made an order to the effect that where a tank did not pay so much revenue it was to be left to the villagers to keep it up.

3616. When it did not pay it was to be left out?—When it did not pay any very great extent of revenue, or such revenue as would not cover the cost of its expenses in a certain time, it was to be left to the villagers to keep up.

3617. Then the Government kept the paying tanks and left those which did not pay to the villagers?—They were kept up for drinking purposes.

3618. In Madura what proportion of the tanks are kept up by the Government and what by the people?—In Madura I should think one half the tanks fully belong to the zemindars, and the other half are kept up by the Government; and the Government have gone to a great deal of trouble and expense in maintaining them for the use of the people in such a district as that.

3619. Will you be good enough to explain to us what is the character of the tanks in the Bellary district; are they generally large tanks, or is the country well watered by a great number of small tanks, and are the tanks generally independent of one another, or have they a long chain of tanks which are mutually interdependent?—Bellary has some of the largest tanks of Southern India. In that district you have a tank like the Derajee tank, the embankment of which is 12,000 feet in length.

3620. What is the area covered by water?—Between three and four square miles when it is full.

3621. That is one of the largest tanks, is it not?—There are several others; there is the Singunamulla, which has a water spread of several miles.

3622. Are there a good many tanks which cover from three to five square miles?—Certainly.

3623. But the great majority of the tanks are within what limit of size?—I should say from three-quarters of a mile to a mile and a-half square; the depths vary very considerably.

Sir *Joseph M'Kenna.*

3624. By a mile and a-half, do you mean a mile and a-half on each side of the square?—A square mile and a-half.

Sir *George Campbell.*

3625. Are those tanks usually mutually interdependent; are they generally arranged in a chain, one feeding the other, or are they independent tanks?—Those very large tanks are generally speaking at the gorges of the hills, and there are some small tanks above them; but they have a very large area of country draining into them belonging entirely to those large tanks.

3626. What I most want to know is whether in those districts of Madras with which you are acquainted, they have a system which I understand exists very much in Mysore, that is to say, that the surplus water of one tank runs into another, and thus you have a large chain of tanks being mutually fed the one from the other, and an inter-dependent management, which it is necessary should be carried on as a whole, and not as regarding each particular tank?—In certain talooks of the Bellary district, the tanks are just the same as in Mysore, and bordering on Mysore; they have long chains of tanks; but in Bellary they have some of the large ones that I have mentioned in the large valleys.

3627. But that system of tanks in chains is more peculiar to Mysore than to the Madras district?—The southern talooks of Bellary border on Mysore, and there they have exactly the same system; there is only a boundary between the two.

3628. Will you explain to us the system under which the Government tanks are managed by the Public Works Department?—I can explain the system which is worked upon in Bellary. I inspect a tank and take the levels for it, and see what defects there were in the construction or from wear and tear, and make out my estimate, and ask the villagers if by carrying out those repairs as fully as possible, and, generally speaking, we add something to their store of water originally existing in the tank, what increase of cultivation they will take up; and I almost always got an increase of cultivation. The estimate was then sent in to the collector with a statement of what the villagers had said to me or to my executive officer, and he verified the results so far as the revenue was concerned and sent it on to the chief engineer. We carried out the works in Bellary, and in that way for about five years, with the general result of getting an increase of cultivation of from 80,000 acres to 166,000 acres of irrigated land.

3629. Where works have been sanctioned, do you carry them out entirely by hired labour in the same manner as any other public work, or are the villagers in any degree bound to supply labour or material for the tanks?—Very often they volunteer to give the labour; when a great improvement was made to their tank they gave their assistance; I, generally speaking, superintended those works myself.

3630. When they give their assistance, is their labour paid for?—Yes; forced labour has been done away with altogether now for many years in Madras.

3631. How long has that been the case?—I think certainly since 1854 or 1855, if not before.

3632. Does there not now exist any system whatever under which the village communities are bound to furnish labour under any circumstances?—The magistrates may call upon them in the case of an emergency, but we cannot do that.

3633. Do the magistrates ever call upon them in the case of an emergency in connection with the

Sir *George Campbell*—continued.

the irrigation system?—If a tank would be on the very verge of breaching, the magistrate can call upon them to give assistance.

3634. Does he, in fact, do so?—Yes, I believe he does.

3635. Is there legal power still reserved to him to do so, or is it upon the ground of necessity of justifying the law?—That I am not prepared to say. The magistrate and the revenue officer consider that they have that power to protect the Government interests.

3636. When all the repairs have been executed, and the tank is in good working order, will you explain how far the distribution rests with the engineers, or how far it rests with the civil officers? — The distribution rests with the villagers almost entirely; I have interfered myself when I have seen very great waste going on, such as when they supply water to irrigate lands day and night, and there was no absolute necessity for it that I could see.

3637. Surely there must be a necessity for superintendence on the part of some one; inasmuch as a very large number of people are interested in getting water, there must be some system of distribution; is that carried on under the superintendence of the engineer, or the civil officer, or the heads of villages?—The heads of villages, entirely.

3638. Has the engineer any authority to interfere at all?—Nothing more than bringing it to the notice of the revenue authorities if there is a very great loss of water, and consequently a loss of revenue to the Government by it.

3639. Supposing there is a quarrel between two villages as regards the priority of the water, or any matter of that sort, does the settlement of that rest with the engineer or a civil officer?—The engineer and the civil officer together in a case of dispute, but it almost always goes into court.

3640. Surely the responsibility for the immediate distribution must rest with one department or the other, either with the Civil Department or the Engineer Department?—With the Civil Department. The revenue officer generally asks the engineer what the distribution should be, and he gives his opinion. If the villagers do not like the opinion of the district engineer, they go into court about it.

3641. But in the first instance the responsibility rests with the civil officer; the engineer is consulted, but the responsibility rests with the former?—Yes; he takes the opinion of his professional adviser, but the decision rests with the Civil Department. The villagers very often do not like the decision of either the revenue or the engineer officer, and they go into court about it.

3642. Then, as regards the measurement and the assessment of the irrigated land under Government rule, does that rest in any degree with the Engineer Department, or is that left to the Civil Department?—To the Civil Department, the Revenue Department.

3643. The engineers have nothing whatever to do with the assessment?—We inquire what rate the people will pay when we are giving an additional supply of water, and we put it down.

3644. You have nothing whatever to do with the measuring up of the irrigated land?—No, that rests entirely with the revenue officers.

3645. Is the system in the district of Madura very much the same, or is there anything with

Sir *George Campbell*—continued.

Colonel *Fischer*, R.E.

25 July 1878.

regard to what you have told us of the district of Bellary which you would qualify in speaking of the district of Madura?—Only that the native tanks in Madura are very unsatisfactory works in general. It is a low-lying level plain, below the hills. The tanks are innumerable all over the district, but they are very shallow, and hold a very small quantity of water. They never hold enough to mature a crop unless they are filled two or three times in the season.

3646. How are the zemindary tanks managed, are they well managed, or the contrary?—They are shockingly managed; the railway companies have brought frequently to the notice of the Government the disrepair of the zemindary tanks, and the danger to their lines in consequence of the constant breaching of those tanks.

3647. I think you have told us that in your experience there has been a very large increase of tank irrigation in Bellary; has that been the case in other districts of Madras also?—I believe in North Arcot there has been a large increase, and in Chingalpat, and South Arcot, by putting the old native works of the country into repair; many of them were very defective in design, and very defective in getting rid of the surplus water. Changes in that respect have constantly been made, and the tanks have been improved.

3648. It has been sometimes asserted that in Southern India there still exist the remains of an elaborate system of native tanks, which have been very much permitted to fall into disrepair and disuse under British rule; can you tell us how far those assertions are well founded?—In Bellary, I think, there were three or four large tanks which had existed before. One was restored by the Government, for which I made an estimate; and the other one I did not think it was worth the while of the Government to restore at the time that I was in charge of it, as it involved a very large expenditure. It was soon after the Mutiny, when the Government were not prepared to take up works of that kind.

3649. At this moment are there the remains of many old irrigation works which have not been restored under the British Government?—I cannot say from my own personal knowledge. People say that there are in Cuddapah, and Arcot, and other parts of the country, but I have not examined them myself personally. I know that the Government have always been very anxious to keep the irrigation works of the country up as much as possible. In fact, during the Mutinies, the Government gave very large sums of money for repairs.

3650. Why during the Mutinies? — Their finances were called upon for other works, and almost all improvements were stopped while the Mutinies were going on, except military buildings.

3651. I thought you said that during the Mutinies the Government gave very large sums?—Yes, for repairs of works, not for new works.

3652. What I want to understand is, why the Government should, during the Mutinies, give very large sums?—They said they would keep up all their works. They could not undertake new works, but they would keep up all the works of the country.

3653. Do you mean that they gave more during the Mutinies than they had been accustomed to do before?—Yes, certainly they did to me in Bellary. As the Bellary works have been

Colonel *Fischer*, R.E.

25 July 1878.

Sir *George Campbell*—continued.

mentioned, I may mention the expenditure on them.

3654. The Mutinies had no connection, had they, with your getting more monies for repairs?—No, I only mentioned that circumstance to show that the Government have been most anxious to keep up the works of the country. In Bellary the average expenditure on repairs was about 7,500 *l.* When I took charge, in the first year, I spent about 8,000 *l.*; the next year I spent 18,000 *l.*; and the next year I spent 10,000 *l.* in getting the tanks into working order and repair; and then I reduced the expenditure to about 3,500 *l.* a year.

3655. Have you any reason to suppose that during the earlier part of our rule in the districts of the Madras Presidency irrigation works, which had been active during the native rule, fell to some extent into disrepair?—Most certainly they had fallen into very great disrepair when we took charge of the country.

3656. What I want to know is, whether the irrigation works which we found in operation were allowed to fall into disrepair and to diminish during the first generations of British rule?—During the first generations I do not know that the repair of works, or public works in general, were very actively taken up by the British Government; indeed, I may say, for many years after we got charge of the country.

3657. Can you tell us what has been the financial result of the measures which you took to increase the irrigation in Bellary?—I can give you the increase of area, which was about 86,000 acres.

3658. Can you tell us the total expenditure in obtaining that increase?—About 36,000 *l.*

3659. I presume, the expenditure not having exceeded 36,000 *l.*, the result was very remunerative? — Not in revenue. The Government allowed a very large reduction in the assessment; at that time the assessments were revised, and a very large reduction was allowed.

3660. So that the result was not remunerative in point of revenue?—Not remunerative to the Government directly, although it was to the people. It gave them a much larger produce. The assessments made originally in Bellary were made, I think, by Sir Thomas Monro, and they were considered very heavy. It was constantly represented to the Government that the assessment of Bellary was very heavy, and they ordered a revision to be made and a great reduction.

Mr. *Sampson Lloyd.*

3661. Supposing that this irrigation of 86,000 acres had not been obtained, would not the land revenue of the Government have been much reduced if these works had not been carried out?—I should think so. The revenue authorities asked me for the results, and I showed them the results, and they admitted the increase of the area, but they said that on account of the reductions made in the rate of assessment there was no direct revenue.

Sir *George Campbell.*

3662. Is it your opinion that in the districts of Madras, with which you are acquainted, there is still room for a large extension of tank irrigation with profit to the revenue?—Certainly, very large.

3663. Could you give us a rough opinion as to

Sir *George Campbell*—continued.

how far tank irrigation might be profitably increased in the district of Bellary; do you think it could be doubled with profit?—It depends upon the scheme which you happen to take up. If you take up the Toongabuddra project I see no reason why it should not, with so large a reservoir across the Toongabuddra river; it is a gigantic tank.

3664. Putting aside questions of very gigantic reservoirs, which are of a very different character from the existing ones, do you think that the present tank irrigation of the character which now exists could be very largely extended?—I think so; I think it might be very much improved.

3665. Do you think it could be doubled?—I am not prepared to say; I have made a very large increase myself, but still I was anxious to make a still further increase of the water; but I could not carry it out with the funds I had available.

3666. You would not go the length of saying that it could be doubled with profit?—No, not these small works.

3667. Putting aside for the present projects for the future, are there any other irrigation works in those Madras districts besides tank works, which are now in active operation in the Upper District with which you are acquainted?—There is the Kurnool irrigation work.

3668. Are there any other small works?—There are the works proposed for the Nellore district.

3669. Are they in actual operation at this moment?—No, they have been proposed and suggested, but they are not in actual operation that I am aware of.

3670. Can you tell us anything of the works of the Madras Irrigation Company; have you had any experience of those works?—I have not been personally employed upon them. When the original project for irrigation from the Toongabuddra was taken up, Lord Harris gave me the papers, and asked me to look into the matter in the absence of Sir Arthur Cotton, with regard to the general suggestion which he had made for irrigating from the Toongabuddra. I took some rough levels, and sketched out a design for irrigating from the Kurnool in lieu of the Bellary scheme, which Sir Arthur Cotton had proposed for irrigating Bellary from the right bank of the river, as well as the Ruichon Doab.

3671. Have you any knowledge of the present state of those works, and the result of them?—I have seen it in the papers, but I have no personal knowledge of them; I was never employed upon them.

3672. I think you told us that you had been twice employed upon the works of the Godavery delta; had you a part in the original construction of those works?—No. When I joined the Godavery works the annicut had been finished, and the system of irrigation and navigation was being actively developed.

3673. But it was not in full operation?—No, not in full operation, but it was being developed; it is not in full operation yet.

3674. What is the character of the portions of those delta districts which would have been irrigated; what was the nature of the cultivation?—They cultivated the cholum crop very largely, the same as jowari, the Bengal gram, and the ordinary

Sir *George Campbell*—continued.

ordinary Madras gram, and there was some cotton cultivation.

3675. Was the cotton cultivation considerable?—It had been, I believe, very considerable, but it had fallen off again when the trade of India was thrown open after the Company's monopoly was done away with. The district had a large cotton cloth trade in former years.

3676. Has that cotton trade now disappeared?—Entirely.

3677. Is the cultivation which is substituted almost entirely rice?—Very largely; a very large area of first-class rice is under cultivaiton now.

3678. Do you consider that those works on the Godavery Delta have been extremely successful?—Certainly.

3679. Are they without any drawback in respect of unhealthiness or exhaustion of the soil, or anything of that sort?—There is no exhaustion of the soil; the soil is fertilised from the river every year. That is not the thing complained of by the people at all.

3680. Have you observed any unhealthiness attending the irrigation system?—We had a very unhealthy season indeed in 1869 from fever, but the doctors were of opinion that that was not due to irrigation. The population has increased very largely, and the people have increased enormously in wealth and comfort.

3681. On the whole, you are of opinion that the health of the district has not deteriorated?—I should think that the health of the district has considerably improved.

3682. Was the district an unhealthy district before?—It was a very feverish one and a very poor one.

3683. And you think that there is now less fever than there was formerly?—I believe so. The fever was of a very ordinary type. A great deal has been said about it, but during the whole time I was there, and I have treated many cases myself, I never saw a case that could not be easily recovered.

3684. I believe the Godavery district is the only part of India in which navigation is largely combined with irrigation; in your opinion has this system of navigation been very successful there?—Most successful.

3685. Do you see any reason why such a system of navigation should not be applied to other irrigation projects?—It will be carried out in the Khistna deltas.

3686. Can you explain to us the reason why there has never been any system of navigation in the Cauvery district?—I do not know; I suppose it is because the Cauvery river has not such a good supply of water in it as the Godavery has. The Godavery is a remarkable river for an Indian river. There is a very large supply of water in the river for certainly nine, and, with economy, for ten months in the year. The Khistna, a neighbouring river to the Godavery, and which is another large river, has not anything like that supply. The Khistna channels are, generally speaking, dry by February.

3687. Do you think that there can be any perennial system of navigation in the Khistna delta?—By storing water up in the upland districts like Bellary.

3688. But otherwise it would not be perennial navigation?—No, the Khistna has too steep a slope; I believe it is supposed to carry as large,

Sir *George Campbell*—continued.

if not a larger, volume of water to the sea than the Godavery, but it runs off with such enormous velocity that the water is not available for the length of time that we have it in the Godavery.

3689. Have you ever visited the irrigation works of Northern India?—No, I have not.

3690. I think you visited the central provinces with a view to ascertain whether it might be possible to establish reservoirs on the upper branches of the Godavery; will you tell us the result of the inquiries which you made there?—The first work which I went upon was the Pench River. There was a reservoir proposed for that up in the jungles. That I could not fully investigate; the season was so very unhealthy that I was obliged to bring the camp away.

3691. Then you did not succeed in getting sufficient data to enable you to recommend that large reservoir?—I fixed upon a very good site on the Pench for a reservoir.

3692. But you did not survey it sufficiently to ascertain whether it could be carried out with advantage?—No, I could not do that as my assistant, Mr. Shepherd, was very nearly dead, and more than half of my camp were ill with fever; so that I was obliged to get out of the place.

3693. Was there any other project that you know of sufficiently surveyed?—Yes, I proposed a large reservoir on the Kunhan River, about 22 miles above Kamptee.

3694. Did you completely survey that project?—I laid it out partly and left it, and it was carried out afterwards by Mr. Armstrong, the chief engineer, and the estimate submitted to the Government of India.

3695. What was the result?—The result was that they asked for more than a million of money for the work. I had warned them that there was not sufficient land for a larger outlay than between 300,000 *l.* and 400,000 *l.*, and the rate of assessement that they were likely to get. The estimate was made up to 1,000,000 *l.*, and the Government of course refused their sanction for it.

3696. What was the occasion of your leaving the survey before it was completed?—I believe the Government considered that as I was not working on the best terms with the chief commissioner, it was best for me to go back to my own presidency.

3697. But the result was that when the survey was completed, it was found to be so expensive that the Government of India thought it would not be remunerative and abandoned the project?—Yes.

3698. Will you mention any other schemes which were suggested to you for storing water upon the upper branches of the Godavery?—There were some small schemes in Kundwa that I went to, and I went upon the Wurda River to look for a canal from the Wurda and for a reservoir; but I found no favourable site for a reservoir on the Wurda, but I did the survey and the levels for the canal.

3699. Will you tell us some particulars regarding that grand project in Bellary at a height of 1,600 feet above the level of the sea to which allusion has already been made?—The proposal is to have a dam across the river in the Bellary district.

3700. Had you yourself fully surveyed and examined and completed that?—No, I had not

Colonel *Fischer*, R.E.

25 July 1878.

Sir *George Campbell*—continued.

completed it; it was never under me for completion.

3701. Will you have the kindness to tell us how much you had done?—I took the cross sections for the dam.

3702. Were you the originator of the project?—Yes, for that dam.

3703. I mean for the whole scheme of the reservoir?—No, Sir Arthur Cotton had proposed a scheme to take a channel out of the river by an ordinary annicut and to irrigate a large area of Bellary, and to throw a quantity of water into the Penair for the use of the Nellore district. In going over that project of Sir Arthur Cotton's, and taking the levels up and down the bed of the river, I came upon this site for a reservoir where the natives evidently had originally intended to build one; the earthwork is there to this day; and when I found this I took it up at once and proposed it; but as the money had been obtained for carrying on the Kurnool works, and water could be so readily supplied from it for the use of the Koondal Valley and the Nellore district, Sir Arthur Cotton abandoned that project at Bellary and went to Kurnool.

3704. Did you examine not only the site for the proposed dam but also the area on which the water would be stored as the result of building that dam there?—I made a rough contour of it on one side of the river.

3705. Did you not complete the contour?—It was taken out of my hands, and the thing was abandoned and the Kurnool works taken up. Some years after, Mr. Gordon, a civil engineer belonging to the Kurnool works, a chief engineer of the Irrigatiom Company, came to me and told me that he had been ordered to take up this Bellary project, and asked me for my data which I gave him; and he went up and made a survey of the levels for the tank, and a contour for the tank, and brought the canal through the hills in the manner which I had suggested. The Irrigation Company intended to take it up after they had been some time employed upon the Kurnool works, and Mr. Gordon made surveys and level for it.

3706. Have you seen Mr. Gordon's surveys?—Yes. He told me himself that he had brought the canal through the hills in exactly the same way as I had proposed, and he went back to finish it; but in the distribution of the water, the project was so excessively expensive that it was abandoned altogether. I was away from that part of the country, engaged elsewhere, and did not see it at that time; but when I saw the distribution, I saw the mistake which had been made.

3707. Apart from the distribution, had you the papers regarding the survey which Mr. Gordon had made which satisfied you that a reservoir on a very large scale was practicable, and upon what scale?—I have no papers here with me, but I think I could point out upon the map of the district something about the extent of the land which would be submerged by the area of the reservoir.

3708. Were you satisfied of the practicability of that scheme?—I was then, and I am more so now.

3709. Do you remember up to what height you proposed to carry the dam?—One hundred feet.

Sir *George Campbell*—continued.

3710. What was the area of the land to be submerged?—At a level of about 100 feet you will hold the water back for between 80 or 90 miles up the bed of the river.

3711. What would be the breadth of the area submerged?—The breadth would vary very much; at the greatest, I suppose, it would be about six or seven miles wide; but then after you have got up some 20 or 30 miles, the valley narrows very rapidly, and also the bed-fall of the river is smaller.

Mr. *Agnew*.

3712. Could you give us the average width?—I should say it would be about three miles.

Mr. *Sampson Lloyd*.

3713. How many square miles of water approximately would that tank hold?—I calculate that it would hold about 3,000,000,000 cubic yards of water.

Sir *George Campbell*.

3714. Can you tell us approximately how many square miles it would cover?—About three miles wide and 90 miles long.

3715. Then perhaps it would cover 250 square miles?—You might as well cover it as leave it in its present state, because it is as barren as it can be.

3715*. Do you think that it would submerge 250 square miles?—No, not so much as that, perhaps.

3716. Is there any existing tank which has an embankment as high as 100 feet?—I believe the Cumbum tank in the Kurnool district is fully that, it has 60 feet of water over the sluice. I beg to say that I did not intend to make the dam of the reservoir entirely of earth across such a river as the Toongabuddra. If I had to construct it I should build it with concrete blocks with a water-tight wall through the centre.

3717. What would be the length of it?—The length is between 8,000 and 9,000 feet.

3718. Do you think that it would be safe in time of floods, and that it might not wash away and drown the whole country below?—At that site, I believe, it would be perfectly safe, it could not get away there because the river immediately below goes through a very narrow gorge for 40 miles, with hills on either side.

3719. Could you tell us what was the fate of this scheme?—They abandoned it; after Mr. Gordon made his distribution, they said it would be so expensive that it could not be carried out; I happened to go into the matter again before I left India, and I saw how the distribution had been made, and saw that they were carrying the water in a most unnecessarily expensive manner. I have shown the project to several people, and the way in which the distribution ought to have been made, by which there would not have been that expense. I estimate that you could irrigate 1,000,000 acres of land in that district for about 15 rupees an acre.

3720. I understand you to say that the project was rejected and abandoned; was it by the Madras Irrigation Company, or by the Government of Madras, or by the Government of India that it was abandoned?—By the Irrigation Company and by the Government of Madras. They would not recommend it to be carried out as proposed.

3721. You

Sir *George Campbell*—continued.

3721. You are aware, I think, that Sir Arthur Cotton has alluded to this tank as a grand tank from which enormous canals might be carried to irrigate, if not all India, at least a very large part of India; do you concur in the practicability of carrying out a gigantic system of irrigation from this tank to that extent?—In Bellary, I think, it would irrigate somewhere about 1,000,000 acres, if not much more. Sir Arthur Cotton proposes to utilise a large quantity of water in the Carnatic plains; but that is a mere suggestion of his, and I think it is well worth looking into and investigating if you take a large quantity of water and utilize it from the Khistna and Toongabuddra rivers.

3722. Will you tell us what has been the result of your experience of employing natives in important positions in the Public Works Department?—I have found many of them very useful indeed.

3723. Is it your opinion that they might be promoted to much higher positions than those which they now hold?—They have been promoted to very high positions, and they have been holding some very good positions. I would not put a very heavy money responsibility upon them.

3724. Do you think that the present system gives them sufficient opportunities of employment and promotion, or do you think there should be a change, which would give greater facilities to natives to obtain employment in the first instance, and promotion afterwards?—I think the present system gives them very fair opportunities of coming forward the same as it does to any other officer; I do not know that there is any prejudice against them, but the main objection has been that to which I have alluded.

3725. I think you told us that you had at one time charge of the Public Works Accounts Department of the Government of Madras; will you be so good as to tell us whether the receipts from irrigation came within the scope of that department?—Not in my time; I believe it is done now, and that a distinct account is kept; I was only there for a short time.

Mr. *Ashbury*.

3726. In connection with the tanks constructed by the zemindars, where did they get the money from?—I suppose they raised it from the moneylenders.

3727. I mean, were they generally constructed individually, or by means of small companies formed amongst themselves?—I do not know how they have been constructed; I expect there has been a good deal of co-operative labour. The villagers who supposed that they were going to be benefited by those works, gave their labour; they are very old works. I do not know any works myself which have been constructed in my time in that way.

3728. Those works to which I refer, those tanks constructed by the zemindars, are not so much those constructed recently, but ancient works, are they not?—They are old works, which in former years belonged to the villagers; they are quite as old as the Government works.

3739. Still I understand you to say that some of those were constructed expressly for the zemindars?—But those zemindars have held the land for many years, for generations.

3730. Assuming that, how are they remunerated for possessing those works; do they raise a tax?—They raise a tax upon the land.

Mr. *Ashbury*—continued.

3731. Is it according to the quantity of water consumed?—According to the area irrigated.

3732. Have you an idea how much per cent., on the average, these particular tank works have paid to which you refer more particularly?—No, I had nothing at all to do with the revenue accounts.

3733. You spoke of a great waste of water by the water being used night and day very often in a needless manner; what remedy would you personally suggest to avoid such, it may be, reckless waste of water?—Generally speaking, I used to shut the sluices at four or five o'clock in the evening, and open them again early in the morning.

3734. Then the remedy to avoid this waste of water would depend exclusively upon the personal opinion of the gentleman who might be in charge of those particular works?—The villagers very often agreed with me, and did it themselves when it was suggested to them.

3735. The very fact of your having made a remark about the reckless waste of water shows, I suppose, that it must have been more or less pretty general?—It was the custom of the country.

3736. Still, does it not appear to be a very important question for the local government there, to suggest some imperative remedy to avoid such a waste of water?—It is being carried out, I believe; the last account I had from the Godavery Works is, that they have made a very great saving in the supply of water. We used to give two cubic yards per hour per acre, and now they only give one-and-one-third cubic yards for navigation and irrigation combined.

3737. Would that be irrespective of any temperature of the weather, or was that the general rule, whether it was required or not?—If heavy rain is falling, the supply is very much reduced.

3738. With reference to the tanks in the possession of the zemindars, you stated, I think, that they were badly managed?—We have nothing to do with their management, but they are in a bad state of repair, and the subject of general complaint.

3739. Even as regards the management, do you think there is much scope for improvement in the management of the tanks of the zemindars generally?—I believe there is.

3740. What form do you think it should take?—I think they ought to be put into thoroughly good working order, and maintained in that way with proper waste weirs to discharge their surplus water safely.

3741. So that the effect would be to keep the works in thorough good repair, and at the same time partially avoid any waste of water, I suppose?—Yes.

3742. Have you any experience of steam-power on the canals in India?—We have used small steamers on the Godavery canals.

3743. Have you any idea to what extent generally in India, steam power is now being used, or has been used?—To a very small extent it is used on the Indus, I believe, and it is used in some parts of Bengal and on the Bramapootra.

3744. My remarks were intended not to relate to the Indus or other rivers, but to canals proper?—The canals have not been used at all for steam navigation purposes.

Colonel *Fischer*, R.E.

25 July 1878.

Mr. *Ashbury*—continued.

3745. Not even experimentally?—We have used steamers on the Godavery canals occasionally. We had two small steamers working there for ourselves, and they were constantly in use at one time; but I took them off the canals. They were only required for the use of the Government officials and some of the merchants of Cocounarla. There is such an abundance of native craft on the canal that the steamers were dangerous to them, and I thought it was better to put a stop to it at once.

3746. Assuming the principle of our policy settled, that money, to a certain extent, should be spent upon canal purposes, chiefly for irrigation, is there any objection to the use of steam power on those canals for navigation purposes?—I should say none whatever, from the experience which I have been able to ascertain in the Indian and English canals.

3747. Am I right in thinking that in England goods could be carried at about a fraction under a farthing per ton per mile upon English canals by steam?—The goods traffic now, according to the "Edinburgh Review," on the Aire and Calder Navigation, is one-eighth of a penny per ton per mile, after 20 years' experience.

3748. Taking that as a basis, and assuming that steam power could be used on the Indian canals, in your opinion would the canals be worked as profitably?—Yes; that would be so at even at one-eighth of a penny per ton per mile.

3749. Do you suppose, from what you know of the working of canals in this country and in India, that goods could be carried, we will say, at a farthing per mile per ton?—As far as I have been able to ascertain, the Indian railways carry goods at about the same price as the English railways do; and I do not see why the canals should not be able to do the same work as the English canals do. The Indian railways, from what I have been able to read, are carrying at about the same rate as the English railways are carrying at, and why should not the Indian canals be able to carry at the same rates as the English canals are carrying it at now.

3750. Then it is, as I say, that goods might probably be carried in India at a fraction something less than a farthing per ton per mile?—I should think so; they ought to be.

3751. That is giving the Indian canals credit for being more expensive to work than the English canals, which are being worked at one-eighth of a penny per ton per mile?—The English canals are working at one-eighth of a penny per ton per mile, and the average rate for goods traffic on the Indian railways is 1·233 of a penny per ton per mile; so that the English canals are now carrying at about one-tenth what the Indian railways are carrying goods at.

3752. In about 1864-5 there were about 2,500 miles of railway open in India; have you any knowledge as to what the rate was about that period for carriage per ton per mile, speaking from memory?—No, I have not any idea; it is a matter of complaint that data were not forthcoming until very recent years in India, and Mr. Danvers has only been able to get sufficiently accurate accounts of recent years.

Mr. *Agnew*.

3753. You were speaking first of the tanks in Bellary and Madura, and you told us that the tanks in Madura, mostly belonging to the zemindars, are unsatisfactory, but that the Bellary tanks, which are under the Government, generally give a sufficient supply of water, at least, over one season; will they supply water for two seasons in case of the failure of the monsoon?—No, not for two seasons; they are not sufficiently large for that; the rainfall of Bellary is very peculiar.

Mr. *Agnew*—continued.

3754. You would not consider then that those tanks in Bellary, under the Government, were sufficient protection from famine?—Oh dear no; Bellary has, since 1850, suffered three times from famine.

3755. You told us that the present system of tanks has very much increased the profit, but not to the extent of doubling it; if that increase were carried out, would it be sufficient to save the country from famine?—No; the total area of irrigation in Bellary, at the very best, was only about 186,000 acres; the district is double the size of Yorkshire; it is over 11,000 square miles of country.

3756. I meant the question to apply to the district within fair reach of wet cultivation, that would be produced from the increase of this tank system, which you think could be made with profit?—It would be profitable for the people for the time being.

3757. But it would not last them for a second season?—No, certainly not; a famine occurs almost immediately on the failure of the monsoon.

3758. In speaking of the Delta works, you said that rice had been largely substituted for other crops that used to be grown in those countries?—First-class rice is now entirely substituted.

3759. Do you think that the districts have suffered to any extent by the cessation of growing other crops instead of rice?—Certainly not; the land revenue has increased, the productiveness of the land has increased, and the people very readily take the water if their canals are made navigable, but otherwise they will not take the water so readily.

Mr. *Balfour*.

3760. Will you explain that a little?—They cannot otherwise carry their produce to market.

Mr. *Agnew*.

3761. In speaking of the large scheme for a tank on the Toongabuddra river, you said that you dam the water back for 90 miles, at an average breadth of three miles, submerging 250 square miles; but you said it was a valley that was barren and unproductive at the present time?—The greater part of it is very barren land indeed.

3762. But when you speak of a dam 100 feet high damming the water back for 90 miles, there must be very little fall in the course of the river?—It is a very remarkable instance. Many suggestions had been made before the papers came to me for taking off canals from different parts of that river. There is an existing annicut at a place called Wallabypore. When the papers came to me I determined to see what the bed of the river there was. Taking the Wallabypore annicut as my datum, I levelled right up to the confluence of the rivers Wurda and Toongabuddra for about 97 miles right along the bed. For the first 70 miles I got a very slight rise of about eight

Mr. *Aynew*—continued.

eight inches to a mile; then I came to a rapid. The next 10 miles we rose to about 56 feet.

3763. Is it not contrary to all experience that there should not be an alluvial valley where the fall is 10 feet a mile; is not that generally the case where the fall is so slight, and the river runs between banks of alluvium which had been deposited in previous seasons?—Not in that part of the country. It runs in great part between hard granite rocks. There is a little black cotton soil on one bank.

3764. But there is no deposit that would make the land of any considerable value?—Not where that river is.

3765. I am speaking of this one valley that you spoke of submerging; it struck me when you spoke of the fall being so slight that, if it was like other rivers, there would be alluvial soil about it, and I wanted to know the reason why in this case the ground is of so little value?—It is hard rocky ground.

3766. Did you examine it yourself, and are you able to tell the Committee that the land there is of little value?—Yes, it is of very little value.

3767. Supposing that scheme which you say will still be needed, but which the Government have abandoned on the ground of the expense of the distribution, were fully carried out in the way you would wish it to be, and the water utilised to the fullest extent that it could be done so as to make it a paying project, would that large reservoir hold water for more than one season?—Yes, certainly.

3768. Even if it were fully utilised for the district of Bellary and also Nellore?—The Tongabuddra is a perennial stream fed from the Western Ghats, entirely under the supply of the south-west monsoon.

3769. And you would consider that a permanent supply?—Yes, it is a permanent supply during the monsoon season for the full area of rice cultivation, and after that I should think a large area of garden cultivation could be matured by the water which the tank would retain during the dry season.

Sir *Joseph M'Kenna.*

3770. Did I rightly understand you to say that you based some of your views upon the calculation that goods could be carried by canal in India as cheaply as by canal in this country?—I said I did not see why carriage by canals should be more expensive in India than in England, as the railways generally carry goods in India for the same rate as the English railways are carrying, on an average.

3771. But you know that the rates at which goods are carried in England depend very largely upon the making up of a certain increase to the traffic which depends largely upon the passenger communication, and that you would not be able to make a remunerative scheme in India by carrying goods at a rate per mile like that at which they were carried in England; and unless you established a certain parity in the other branches of traffic, you have no right to reason from the one to the other; that is what I would suggest to you?—But we mix up the goods with the passengers.

3772. For instance, they carry coals by railway from the North of England at a charge of a farthing per ton per mile; it does not follow that it would have been a remunerative speculation to establish railways for the sole purpose of carrying those goods at such a price per ton per mile; but being once established as a remunerative traffic, or a traffic more or less remunerative being drawn from other sources, it may suit railway companies to make an addition to their revenue by lowering their charges to that low rate; what I want to draw your mind to as skilled in these matters is, that it does not follow, unless you could establish the fact that the other sources of railway revenue in India would resemble or nearly equal those in England, that it would be a paying speculation to establish railways in India for the purpose of carrying at those rates, although those rates seem to make a fair return on railways in England?—I can only judge of the matter from the averages which are given. The data that are given are the averages. We know very well what we are paying on the Godavery Canal for manual labour, and for the carriage of Government goods and Government materials; and from that we judge what the produce can be carried at.

Sir *Joseph M'Kenna*—continued.

3773. But the original cost of construction of a public work like a railway or a canal has really nothing to do with the cost at which they can afford subsequently to carry goods or passengers; being once established, the original cost of construction ceases to affect the rate at which they can carry; it is the cost of maintenance that affects it then; but it is more or less a paying concern upon the capital that is involved if you get a more or less remunerative price for your carriage?—Perhaps I may be allowed to ask whether you think you can carry goods by railway at the same remunerative rates that you can carry by canal?

3774. It may so happen, although it would not pay you to establish a railway for the purpose of carrying at those rates if that was all that it was to do; if on the Great Northern Railway all that they had to do was to carry coal to London at its present rates, it could no doubt carry those coals at those rates, because the rates more than cover the cost of the maintenance of the line for the purpose of doing that; but it would not make the original construction of the Great Northern Railway a paying concern; the charges on the railway would maintain the permanent way, but it would not be a sufficient inducement for anyone else, under similar circumstances, to make such another railway; so that I merely suggest this to you for your consideration, whether the mere fact that goods can be carried under certain conditions at a certain price in England, would go to establish that a railway or a canal can be constructed with advantage and with a prospect of remuneration to capitalists, because it could get such a rate as that for water carriage or for railway carriage in India?—I think a canal would be the preferable means of carriage in India.

3775. I do not question that you are better judges of that than we can pretend to be, but I merely suggest to your own mind that you cannot argue from the low rates at which goods can be carried along English railways that have other sources of revenue, that it would pay to make either railways or canals in India to receive the same rates?—You could construct them for much less capital.

3776. If you say you can construct them for much

Colonel *Fischer*, R.E.

25 July 1878.

Sir *Joseph M'Kenna*—continued.

much less capital, and you have an abundance of traffic for the purpose of producing the revenue on that capital and maintaining the permanent way, then the whole case is met; but what I mean to say is this, that it is no argument in favour of either a railway or a canal that such-and-such rates are accepted by railways in England, which make them pay, because the revenue and dividends of railways in England are divided for the most part from other traffic than the haulage of goods at those low rates?—It is very doubtful whether mineral and goods traffic on English lines pay at all. It has been very much written against; but navigation does pay. The Aire and Calder Navigation in Yorkshire does pay. The large goods and mineral traffic on the English lines do not pay according to the statements which are published, and they are only bolstered up by keeping the third-class passenger rate so much higher than it is in India.

Mr. *Hardcastle.*

3777. When you speak of one-eighth of a penny per mile do you mean that that is the mere working charge on it which would pay a fair intereet upon the capital?—If you will allow me I will read a passage from the "Edinburgh Review," page 385: "On the Aire and Calder Navigation steam power is now employed for towage, the charge being 10½ *d.* per mile for a 100-ton barge for the 32 miles downward to Goole, and 1 *s.* 2 *d.* per mile for the same towage upwards, giving a mean cost of ·125 *d.* per ton per mile. This rate of charge is only about 10 per cent. higher than that adopted in 1857; so that the Company have a practical experience of nearly 20 years of the use of a tariff with which it is evident that no land transport can fairly and honestly compete."

Sir *Joseph M'Kenna.*

3778. That is the towage merely; there are other costs; that does not include the maintenance of the canal banks, or the preservation of them from the effects of the wash?—They make that charge, and it answers their purposes to use that canal at that rate.

3779. Does that cover then the receipt by the canal for the carriage?—They publish nothing more. The Aire and Calder Navigation publish no other accounts. This is published by, I suppose, a gentleman who only got that information, and could get no other information. You cannot say what their dividends are, or what their stock is.

Mr. *John Cross.*

3780. Do you think there is any parallel between the cost of canals in England and the cost of canals in India?—I should think so. I do not see why there should not be.

3781. I mean the first cost of a canal in India and the first cost of a canal in England?—I should think one ought to be able to judge from that.

3782. Would not it depend very much, in the first place, on where the canal will go, and the possibility of supplying it with water?—Everything depends upon the possibility of having a large water supply.

3783. Are there any districts in India with which you are acquainted, which could be so easily supplied with water as the Godavery district?—If you make a reservoir like that one

Mr. *John Cross*—continued.

proposed for the Bellary district, it would supply Bellary, part of Cuddapah, Nellore, and a great deal of the Carnatic also with water, on a more extended system.

3784. Have you made any calculation as to the amount of water that would be required for navigation and irrigation purposes in this great district?—Of course we have the calculations for the Godavery district.

3785. You have already told us that the Godavery district is supplied from the Godavery river, which is quite peculiar, containing a very much greater volume of water in proportion to the district it irrigates than any other river in the South of India; have you any reason to suppose that this great navigation and irrigation project which you propose would command the same amount of water supply?—Certainly not the same amount of water supply; but it would command an ample water supply. The drainage area from which this tank in Bellary is supplied is over 12,000 square miles, principally on the western ghats of India, where the rainfall varies from 80 to 150 inches in the year, according to the season. The river comes down almost invariably without fail by the 1st of June, and lasts till November; the heavy freshes occurring between July and August, there is an abundant supply of water.

3786. Then you would bank up 250 square miles of water, and with that 250 square miles of water you would propose, I think you said, to irrigate 1,000,000 acres?—One million in Bellary. My estimate for that was 15 rupees, but more land could be irrigated in Bellary; but it would be very difficult to get at, so that I am afraid that that would raise the average cost of irrigation in Bellary to 20 or 25 rupees an acre.

3787. You say that you would irrigate 1,000,000 acres of land from this great tank; the tank would be 250 square miles; 1,000,000 acres, represent, I think, about 1,700 square miles; you would, therefore, have eight miles of irrigated land for one mile of tank?—Yes.

3788. Is it possible that such a thing would pay at all?—The land pays you nothing now, absolutely nothing. These talooks in the Bellary districts, which would be submerged by this reservoir, have been now for nearly three years almost entirely supported by the Government; they are the most wretched parts of the country and the worst talooks in Bellary. The rains are constantly failing there, and, except a small strip of irrigation along the banks of the Toongabuddra river and one or two other jungle streams about there, they have nothing at all.

3789. It seems that you would, for the sake of irrigating 1,700 square miles, create a tank of 250 square miles?—I think I have given you a much larger area that would be submerged when it came to be actually surveyed out. I cannot give you the actual area. I can give you the length up the bed of the river, and what may be the mean width.

3790. I think you said that, for a considerable distance below this dam, which would be thrown across the river, the country is an exceedingly rocky gorge, and the valley is very narrow?—That is the river.

3791. To what distance would the water have to be carried before you began to distribute it

over

Mr. *John Cross*—continued.

over the 1,000,000 acres which you propose to irrigate?—Twenty-five miles.

3792. You would still have to carry the water 25 miles before you began to irrigate?—Yes. There would be a few acres of irrigation close there, but it would be a very small quantity. You would have to carry the water 25 miles before you began your irrigation.

3793. In what period of time do you suppose this 1,000,000 acres would be irrigated from the time that you began the works?—I should think it would take you five years to carry out the project to bring the water.

3794. Have you made any estimate of the cost?—I have made an estimate. This large dam with the head-works I estimate at 30 lacs of rupees, or 300,000 *l.*; 25 miles of canal through the hill 50 lacs of rupees, or 500,000 *l.*; 40 miles of canal to the Huggary River, including a large aqueduct, 200,000 *l.*; 120 miles of canal towards Kurnaul, 150,000 *l.*; 80 locks, for navigation, &c., 200,000 *l.*; compensation for land, &c., 50,000 *l.*; minor distributaries, sundries, and supervision, 100,000 *l.* That makes a million and a half.

3795. And that would be in the hope of irrigating 1,000,000 acres?—Yes. I had eight years constant experience of the Bellary district, being in charge of all the works there, and I never failed to get the water taken for any land which I proposed to irrigate, and which I showed the people could be irrigated. I never failed in one single instance to get the land taken up.

Mr. *Sampson Lloyd.*

3796. I presume that in expressing approval of this scheme of which we have recently heard so much in the latter part of your examination, you consider that you are giving up 250 square miles of territory which is practically worth nothing at all, and therefore, so far, is giving up nothing in point of value?—I suppose we shall have to give some compensation for it. There will be many houses and villages that will be submerged.

3797. Would it be at all a considerable sum that would have to be paid as compensation?—No, I do not think it would.

3798. Do we understand that the 1,000,000 acres which I think you said would be irrigated at a cost of some 15 rupees, a little more or less, per acre, are now practically almost valueless as regards producing revenue?—They produce a revenue for dry cultivation; there is a revenue, I suppose, of one shilling an acre.

3799. So that there is 1,000,000 shillings, or, 50,000 *l.* a year; what would that produce assuming that it was successfully irrigated?—I always got five rupees for the water.

3800. Then the difference would be between one shilling an acre, and 10 *s.* an acre over 1,000,000 acres, that is 9,000,000 shillings for the proposed improvement of the revenue; would there also be an improvement in the condition of the people?—Very great improvement, especially in Bellary.

3801. So that the benefit of these works, in your opinion, is not confined to the amount of direct revenue that it brings to the Government?—Certainly not.

3802. But it extends to the general comfort, health, and well being of the people?—Yes, and the preservation of the people of the district.

Mr. *Sampson Lloyd*—continued.

3803. And the prevention of future famines?—Yes, and the prevention of famines. That has been a work which has been long under consideration.

3804. Then on another subject connected with that, a witness of great experience appears to have stated that as respects the possibility of conducting navigation successfully on irrigation canals, it is practically very difficult, if not impossible, because in an irrigation canal the water is always flowing in a regular stream, and consequently boats cannot make their way up against the stream; is that your opinion?—Certainly not. We have got in the delta of the Godavery, canals that are being made navigable. In the last statement which I have, out of 528·4 miles of canal in the Godavery district, 462·3 are navigable.

3805. From your own personal knowledge, would you confirm the evidence of that witness that there is great difficulty in moving barges or boats against the current?—I am entirely against that view?—I know that the Italian canals are navigated, although the current is of very much greater velocity than we are using now in the Godavery district. We have never given in our canals a greater slope than five feet a mile, and that is only for half a mile over a large aqueduct. That part is navigable, with difficulty, and I propose in revising the estimates, to remedy that defect; but the slope that we generally speaking give, gives a velocity of under a mile an hour, which is perfectly easy for navigation.

3806. How do the natives work their boats up against the stream?—By towing, just the same as they work on the rivers, the Ganges or any other river.

3807. Inasmuch as many of us know that steam towing is practised on narrow canals in England, and has been for many years, I will not ask you your opinion about it, possibly because many of us know that it is conducted every day, but a further point has been considered also by the same witness to whom I refer, that in almost all cases of irrigation works the supply of water, even, for instance, in the Ganges canal bifurcates into two channels, and each of those channels is supplied with water in alternate weeks; do you believe that to be a real difficulty, namely, that the supply of water in those irrigation canals must necessarily sometimes be partial, and, therefore, insufficient for navigation; and if you think that a real difficulty, how would you meet it?—I would meet it by having large reservoirs, just in the way that the difficulty is met in other parts of the world. In France, I believe, they store the water for the purpose for which it is to be used.

3808. May we gather that you think it possible, without very extravagant expense, to provide a constant supply of water sufficient for the purposes of navigation in irrigation canals generally?—I think so. My experience is decidedly in favour of it.

3809. Would there be no difficulty owing to the strain on the canals for the purposes of irrigation?—The canals must be kept full for irrigation purposes; and I do not see why the boats should not go upon them.

3810. Would not there sometimes be a greater demand for water for irrigation work at one season of the year than at another?—No more than there is in the Godavery canals. We keep

Colonel *Fischer*, R.E.

25 July 1878.

Mr. *Sampson Lloyd*—continued.

those canals full. If you impound a sufficient quantity of water there is no reason why you should not use it regularly.

3811. I gather that you do not see any practical difficulty in keeping a supply of water sufficient for navigation?—Certainly not, if the large rivers are used.

3812. A further difficulty has been raised about those canals, as respects their suitability for navigation, that in many of them there is a good deal of sediment in the water, and that that sediment blocks up the lock gates; do you think, from your experience, that that is a practical difficulty?—I do not suppose it can be anything very much worse anywhere than what we have experienced in the Kistnah River. There is more silt carried by that river than by most of the Indian rivers. It has been reported, by an officer who had great experience, the late Colonel Anderson, of the Royal Engineers, as carrying more silt than any other river that he was acquainted with; and yet there they are establishing navigation on the canals, and keeping them free.

3813. Have you had any experience in the working of canals where there are locks, and in which the water is full of sediment; and, if so, have you or have you not found any difficulty in working the locks?—No, very little; nothing that we could not clear away with a common dredger.

3814. A further difficulty has been mentioned, that in the case of a large canal which debouches into a river, for instance, the Ganges, that if there is a considerable traffic by navigation, such a quantity of water is let out into the river, owing to the frequent use of the locks, as seriously to interfere with the quantity required for irrigation purposes; would you agree with that view of the question?—If that is ascertained you must impound a sufficient quantity of water to meet that waste. If that water goes into the river, and the river is navigable, it will only assist the river navigation.

3815. Only it diminishes, I presume, the quantity of water in the canal above, and would that diminution interfere with the purposes for which the canal was originally constructed, namely, irrigation?—We have navigation canals in the Godavery delta near to the sea, and there is a very large traffic upon them; but we find no inconvenience by the quantity of water which happens to be discharged by the tail of locks.

3816. Have you enough water in the canal, notwithstanding that some of it is discharged in that way?—Quite enough.

3817. We have had some statistics quoted by one witness as to 50,000 tons, or some such quantity, of goods being carried along the Godavery Canal, leading the Committee to believe that that goods traffic is already very considerable; another witness has told us that he at all events thinks that that quantity is fallacious; that it is got by multiplying 50 tons carried over 1,000 miles; and that the quantity of 50,000 tons in the case I have put is therefore really only 50 tons; could you give the Committee any idea whether there is really a considerable goods traffic over any of those canals, or whether the statistics are fallacious in the way described?—I had charge of those works for five years; I collected the licenses for the boats, and had them all registered; and I have had the boats registered through every one of the locks all over the

Mr. *Sampson Lloyd*—continued.

district, and have moved about it, and I believe that there is a much larger traffic on the canals than 50,000 tons a year.

3818. Have you had any experience of the goods traffic on the Godavery?—I had private information sent to me from India last year of the gross tonnage worked on the canals for the whole year, and it is over 484,000 tons a year on all the canals of the delta.

3819. Do you think that that traffic is likely to be maintained or increased; is there a tendency to increase or not?—The tendency, I should say, is to increase. The area of irrigation is extending very largely.

3820. In fact, I gather from the whole of what you have said that you consider the uses of irrigation canals when properly constructed for navigation to be most important to the well-being of the people?—I am perfectly certain of it. I can give you one or two instances in point if you will allow me. A brother officer and myself had to cut two canals for Sir Arthur Cotton in 1852, the Nursapore Canal and the Attaly Canal. The Nursapore Canal was made navigable throughout, and out of 40,000 acres of expected irrigation the people took up over 36,000. The Attaly Canal was simply cut as an irrigation channel, and therefore without any navigation works in it. The area expected to be irrigated by it was about 30,000 acres; but the people never took up more than 12,000 or 13,000 acres. In 1871, when I was carrying out the revised estimates for those works, I put locks into the Attaly Canal to make it navigable, and before we had got the foundations of the first lock in, the people applied for an increase of 10,000 acres of land for irrigation.

3821. So that as soon as they could get their produce to market by means of a navigable canal they took more land?—Yes, they took 10,000 acres at once. The whole of the works for the completion of that canal cost 5,600 *l.*, and 4,000 *l.* was returned for water-rate in the first year.

Mr. *John Cross.*

3822. What was the means of communication before?—The ordinary country bandy roads; in fact, no roads at all; 6 *d.* per ton per mile was the cost of carriage by "bandy."

Mr. *Onslow.*

3823. This scheme which you have proposed is to cost on the average 15 rupees an acre; when that is completed, what do you think the natives will give you per acre for water-rate?—From my experience of Bellary, I should say that you would get 5 rupees an acre.

3824. The country at the present time is uncultivated, and therefore, I presume, very poor?—It is cultivated now with dry crops, but the crops are constantly being lost.

3825. Do you think that the natives will be in a condition for some years to come to give you as much as 5 rupees an acre?—Yes, for the river water. There are nine large native annicuts across the Toongabuddry river constructed many years ago by the natives, and they pay now nine rupeee an acre for the water from those annicuts.

3826. With regard to this estimate of 15 rupees, or 30 *s.* an acre, in your opinion is that an outside estimate, allowing a large margin for extras and things which at present you have not estimated for, or is it merely a bare estimate?—

I think

Mr. *Onslow*—continued.

I think I have allowed very fairly; I have given my estimate to several experienced officers, and they do not consider that is at all insufficient for the purpose.

3827. Have you allowed a large margin for unforseen casualties?—I have not allowed for such things as the works being stopped for a number of years. Whenever such things do occur, there is an enormous loss. Your work-people are scattered, and your supervision is all lost. If the work is systematically carried out throughout, I do not see why it should not be done for that; and even if your estimate came up to more than that in such districts where famine is so constantly prevailing, I think you would get a very fair return for it.

3828. Have you allowed for increase of wages during the time of the construction of those works?—Yes; in my rates I allow very largely for that, much more than what we used to work at in Bellary. I allow, generally speaking, an increase of rate all the way through. In Godavery, when I revised the project, I found that it was necessary to allow an increase of rate on the average of about 7½ per cent., and I worked upon that. I have allowed here larger rates than what I used to work for in Bellary myself.

3829. Then, I understand you to say, that the natives would give you five rupees an acre, on a gross outlay of 15 rupees an acre; that would give you a gross per-centage of 33 per cent., would it not?—Yes.

3830. How much would you deduct from that on account of working, for maintenance, cost of repairs, and so on?—One shilling an acre ought to do that all; I think that is the very outside that we pay for maintenance of works.

3831. And for this great scheme you think that, when it is in what I may call full go, it will only cost 1 *s.* an acre for repairs, and charges of maintenance?—I should say that it ought not to cost more. The Government would be very dissatisfied if any works of that kind did cost more. It does not cost anything like that, I think, for the maintenance of the Godavery works.

3832. Have you had any experience in the famine districts in India during the progress of the famine?—No. I have not had any actual experience of the worst part of the famine. I saw it coming, and I saw it beginning in Madura.

3833. Have you had any experience of the system of famine relief works?—No; I have not carried out any.

3834. In one of your earlier answers you said that you would not put a heavy responsibility on the native engineers: to what did you particularly refer?—To a heavy money responsibility.

3835. Under you what were the duties of the most responsible native engineer officer?—On the Godavery there was a native well known there, who was many years in charge of the annicut works at the head; and there was another native for a long time in charge of the workshops and steamers.

3836. When you say in charge, do you mean in sole charge, with no European to supervise?—No; we always had European supervision.

3837. Then you cannot say that the man was actually in charge, if he was supervised by European officers?—He had executive charge, the same as a captain has the charge of a company.

3838. And what was the pay?—Three hundred and 350 rupees a month, I think.

Mr. *Onslow*—continued.

3839. Would you advise that native engineer officers should be placed in posts of higher trust than that?—As soon as ever they are qualified for it, I think it would be the very best thing that could happen to the country; but I have not seen many of them who were qualified for such a charge as that.

3840. You mean qualified men in an engineering point of view?—Yes. They have to gain their experience the same as English engineers have gained their experience in England; and there is a very great deal for them to learn.

3841. And you think that if native engineer officers were qualified by education for higher posts, they should be put into those posts?—Certainly. I believe that the Government would be only too glad to put them into such posts. There are natives now occupying very high posts under Government as judges.

3842. Then, as regards this money responsibility which you rather object to, do you think that there would be no difficulty on that score in the higher posts?—There is a difficulty, and one which is very much to be regretted. I suppose it would correct itself in time, but it has caused a very great deal of vexation, and annoyance, and loss.

3843. Is it your opinion that the money difficulty will be a permanent bar to the promotion of those native officers?—I hope not.

3844. I am asking you your opinion from your experience?—As to a permanent bar, I hope it will not be that, certainly; I hope that their condition will be so much improved that they will be able to take up that responsibility.

3845. The honourable Member for Bolton has put to you some questions regarding the expense of the construction of canals in England; have you any practical experience of the construction of canals in England?—None.

3846. Then your opinion regarding the analogy between the construction of English canals and the construction of canals in India is only from what you have read; you have actually no practical knowledge?—Except that as an engineer going over the country, and seeing the ground; you can judge pretty well what the expense of a canal would be, and what the difficulties would be; you can find out from your plans and your levels. I should think that in India a canal would not be nearly so difficult to construct as it is in England. You have very undulating country to deal with in England in many parts, whereas in the plains of India you have not that great difficulty. That difficulty certainly would not occur on the vast plains of the Carnatic, or on the vast plains of the Madura district.

Sir *Joseph M'Kenna.*

3847. With regard to the quantity of water to be created by the single work of draining the river, you rather startled some of us when you reduced it to cubic yards; I think you said it would be 3,000,000,000 cubic yards as the quantity of water that would be dammed up; I have taken the trouble of computing that, and I am bound to say it appears to me to be quite probable and practicable to make it in that way; if a river were dammed, as I make it out, for 140 miles, and the average width of the water inclosed were 1,000 yards, that is 3,000 feet, and the depth were an average of 30 feet, it would make something over 3,000,000,000 cubic yards; in fact, with the exception of the single dam, it would merely

Colonel *Fischer*, R.E.

25 July 1878.

Sir *Joseph M'Kenna*—continued.

merely be widening the breadth of the river, and construoting an artificial lake in that way; did I understand you rightly in that?—Yes.

3848. Taking the dam alone, what would it cost apart from all the other works?—£. 300,000 is what I have estimated the dam at.

3849. Then the other items bringing it up to a million-and-a-half, might be varied according as it was found requsite to vary the scheme, but the 3,000,0000,000 cubic yards of water could be damned up at a cost of about 300,000 *l.*?—That is my estimate.

Sir *George Campbell.*

3850. We have been told that there still remains a great deal of ground in the deltas of the Godavery and Khistna, in which the irrigation might be extended; can you tell us any particulars upon that subject; is it your opinion that in the deltas, irrigation might be very largely extended with profit?—Certainly it is; the Government have already sanctioned very large sums of money for the extension of irrigation in two out of the three portions into which the Godavery Delta is divided, the eastern and western, and what we call the central deltas In the Western delta, we have already exceeded what was expected in the extent of irrigation; we were to have brought the irrigation from about 200,000 acres and odd, up to 296,000 acres by the revised scheme. The last information I had said, that the whole had been taken up with an excess of 2,000 acres.

3851. Beyond the extensions which have already been sanctioned, is it your opinion that there is room for very great further extension?—In the Godavery, it depends a great deal upon the drainage works; you have got to drain away the Coluir Lake, which is just under the wash, as it were of the water, of the loose water lying there. If that is drained away, you can get a very large extent of land, and there is a very large extent of land still to be recovered near the sea.

3852. But is there a great quantity of land of the same character as that already utilised, which remains to be irrigated by the Godavery works?—By the last account that I saw, the total extent of the irrigation of the Godavery was under 600,000 acres; if so, I should say that there are fully 400,000 acres that might be added to it.

3853. Is there a large extent of land of the same character as that unirrigated?—It is all alluvial delta soil.

3854. I think you have told us that there is a great part that is now under water?—Yes, and if that is added, it would be largely in excess of what Sir Arthur Cotton estimated for originally.

3855. You think that there are 400,000 acres of land available?—Yes, belonging to the original delta.

3856. Have there been any projects submitted for that irrigation which have been rejected by the Government?—No; a part of the Eastern delta was rejected at one time, and then it was ordered to be revised, and after considerable discussion, it was sanctioned almost in the same way that I had originally proposed it; the part called the central delta, has never been up before the Government; the chief engineer has it still by him, and he says that he does not consider that he has sufficient supervision to carry it out with.

Sir *George Campbell*—continued.

3857. Is that the only reason why the proposal has not been carried out?—I believe so.

3858. Is it not the case, that this Godavery irrigation has been in operation for some 30 years, and can you explain why no plan for extensions has been submitted if the existing irrigation is so successful?—The works were going on very actively up to 1857, and the Government were most anxious to carry them out. When the mutiny occurred, the works were stopped for some years; then the Government, at General Strachey's suggestion, I believe, wished to have the whole thing revised, and estimates sent in for the ultimate cost as nearly as possible. I do not know why those estimates were not approved of or sanctioned. The papers were ultimately sent back to me in 1869, and I prepared then the revised estimates, and sent them up in 1870.

3859. Have those not been sanctioned?—The Western delta is sanctioned in full; of the Eastern delta two-thirds is sanctioned; but one-third was kept back for revision, but it was subsequently sanctioned in 1874; the central delta is still with the chief engineer; it has not been before the Government.

3860. Then the Government have not shown any indisposition to carry out the work so far as the plans have been submitted to them?—So far as I have been able to ascertain, I believe Lord Napier has been most anxious about getting the work completed.

3861. What is the state of the Khistna works?—Of the Khistna works, the revised estimates, I think, have not been sent in.

3862. How much irrigation is now completed?—About 250,000 or 300,000 acres, I believe.

3863. Do you consider that the irrigation of the Khistna delta is as successful as that of the Godavery?—It has not been carried out upon the same principles; unfortunately the late General Orr and Colonel, now Sir Arthur, Cotton, never agreed about the system of carrying out that work; General Orr, who very successfully built the Khistna annicut, did not lay out his irrigation canals sufficiently large (there is no doubt about that), or as navigation canals; he confined himself more to the river and the works of the dam itself, which was a very heavy work; and the development of the irrigation there has never been so great as it has been in the Godavery.

3864. I think you told us that the Khistna is not so good a river as the Godavery?—During the monsoon season it has abundance of water.

3865. Is the delta as large and as favourable for irrigation as the Godavery delta?—I believe so, quite.

3866. You think that there is great room for the extension of irrigation in the Kistna delta?—Very great room indeed.

3867. But the plans have not been carried out on account of a difference of opinion between the engineers?—That was many years ago. The Government have been constantly asking for the plans, and I believe that they are now preparing; but I have never had charge of the works, and therefore, know nothing about them.

3868. You do not know why they have not been prepared all this time?—I believe the officers have not made up their minds exactly what should be done.

Mr. *Agnew*.

3869. You spoke of the advantage of storing river water in large reservoirs, is it not a fact that the silt carried by the rivers would be deposited in those river works, and not applied to the land by the irrigation?—I think that you want large outlet sluices from your reservoirs, and very large ones from this large reservoir to carry the large volume of water which you propose to use for irrigation. That would take out a large quantity of the silt with it. It is conveyed at the present moment from the ordinary tanks.

3870. But if you had such a large reservoir as you speak of on the Toongabuddry, would be 70 or 80 miles long, and without much flow, it also being a river which you say has very little alluvial matter conveyed in it; according to that scheme you would not expect much benefit to arise from what was carried down with the water?—But it would always have a quantity of silt in it, and that silt could not all be deposited in the tank itself.

Mr *Agnew*—continued.

3871. I think in a previous answer you told us that there was no alluvial soil on its banks?—There is no alluvial soil immediately on its banks; but it does not follow that it does not collect it from other soils. Every stream collects silt as it runs off. It does not run off pure water of itself.

3872. You stated that previously there was a very slight fall for 70 or 80 miles or so, above the annicut, as you propose to make it, and you also stated that the soil was quite favourable; I then asked you whether it was the case that when a river has a very slight fall it deposits alluvial soil on the banks in floods; and you said that this river came through a hard stone district and did not carry silt?—I do not say that it does not carry silt at all, it comes through a certain extent of jungle, and of course carries a great deal of silty matter with it.

3873. And yet there is no fertile ground upon its banks, although the fall is so slight?—Very little; it is almost all dry cultivation.

Mr. ALEXANDER MEADOWS RENDEL, called in; and Examined.

Chairman.

3874. I BELIEVE that since 1856, you have been consulting engineer to the East Indian Railway Company, and since 1872 you have been consulting engineer to the Government as regards the railroads which are undertaken by the Government?—Yes, I have.

3875. Have you paid any visits to India during that period?—Yes, I have been to India four times, in the early parts of 1858, 1868, 1876, and 1878.

3876. In those visits I assume that you have travelled over a great part of the Indian railroads?—Yes, I have travelled over nearly all.

3877. And you are in a very favourable position to express an opinion as to whether it is or is not a country favourable to the construction of railroads; what is your opinion upon that point?—I think it is peculiarly favourable; there is no difficulty in it except the crossing of the rivers and the flooded districts; but in every other respect I think it is far more advantageously situated than this country; for instance, for many hundreds of miles you travel over country which requires a mere low earth-bank, and the works generally are exceedingly moderate in character.

3878. And the great difficulty has been that of bridging the rivers?—Yes, that has been the great difficulty.

3879. I suppose the rivers there attain a size which is quite unknown in this country?—Yes, and they are very erratic in their courses; they are constantly shifting their beds. In the rainy seasons you really can hardly tell what is going to happen.

3880. There were great mistakes made at first, were there not, in the construction of those bridges; could you describe to the Committee what they were?—We altogether underrated the difficulties of the case. We did not put the foundations deep enough; we did not confine the rivers in their courses, and we did not give large enough waterway; and the consequence was that after the bridges were constructed, we got a flood greater than we anticipated, and the bridges were simply washed away.

Chairman—continued.

3881. I suppose those defects have to a considerable extent been remedied in the bridges which have been recently constructed over the great rivers in Punjab?—Yes, I do not think we shall hear anything more of them.

3882. Then as regards the materials and workmen, was there much difficulty in getting them at all from indigenous sources?—Yes; we had to carry out everything. In all Lower India, there is no material to speak of. You had to burn bricks, and there was considerable difficulty in getting the proper amount of lime, and so on. There was no large amount of skilled labour in the country, and the whole had to be created, and of course there were many failures.

3883. Then as regards the route, in certain instances, mistakes were made?—The country was unknown practically to anybody. I think we began the construction before a sufficiently thorough examination had been made in many cases. Then there were certain foregone ideas as to the proper routes to be taken which guided us to a great extent.

3884. During the period in which that system of railways was being laid out, the Indian mutiny broke out?—Yes; and that entirely disorganised certainly the line with which I was connected. We had a considerable number of our officers killed, and a considerable portion of our works destroyed. The works were brought to a standstill for something like 12 months, and generally we had to begin again under disadvantageous circumstances; and not only that but the route of the line has altered to some considerable extent.

3885. Taking into considerating all those difficulties, what is your opinion as regards the outlay upon construction?—No doubt if we had to do it again, we could do it with less money, provided we had our present experience, but I do not think there is very much to complain of on that point.

3886. Do you think that more mistakes were made in India than there were in England?—No, I do not think there were.

Mr. *Rendel.*

25 July 1878.

Chairman—continued.

3887. In fact, it was as necessary there as here to buy our experience?—Yes, and we have bought it, on the whole, tolerably cheap.

3888. As regards the working, is the climate favourable to the permanent way?—Extremely favourable; it is warm and dry, and is very good for the road, and it is also very good for locomotives. We get greater effect from our locomotive power than you can get in this country.

3889. I suppose at certain seasons of the year you have a great deal of rain?—Rain does not matter; it is the damp which is the injurious thing to locomotives. The rain does no particular harm to us so far as the locomotive is concerned, nor, indeed, so far as the road is concerned, provided it is fairly kept up.

3890. There was another difficulty which you experienced at first, was there not, namely, to obtain fuel?—Yes, fuel was a difficulty, excepting in Bengal. We always had good fuel in Bengal: but latterly, on the East Indian Railway, we have opened up some new collieries, and we get our fuel at a very low rate indeed, and are able to sell it to the Government lines at a very low rate also.

3891. Then the East Indian Railway is rather favourably situated as regards the fuel?—Yes. When I say that we supply it to the Government lines at a very low rate, it is a comparatively low rate. I should think fuel, on the whole, in India would be about three times the cost of it in England. In the case of the East Indian Railway, our fuel at the point of consumption costs 16 *s.* or 17 *s.* a ton. We supply our own fuel; we have our own mines; the cost at the pit's mouth is not more than 5 *s.*; but we have to carry it about 350 miles on the average.

Sir *George Campbell.*

3892. When you say three times the cost, do you mean with reference to a ton of coal, or with reference to the motive power?—With reference to a ton of coal. The coal that we get is as good as any English coal; it is Kurhurballee coal. Speaking within limits, it is enough to say that it is as good as fair English coal.

Chairman.

3893. Have any other coalfields been discovered which could be utilised for other railways?—Yes, there is coal in Central India, in Warora, and also near Jubbulpore.

3894. Then that difficulty of coal, to a certain extent, has been overcome?—Yes; but we carry coal very cheaply; and it is worth while to burn our coal when carried a thousand miles upon the railway.

Sir *George Campbell.*

3895. Is the Chanda coal decidedly bad; is there no hope of getting good coal in the Chanda district?—I should not like to speak to that. When I saw him, Mr. Ness did not speak very favourably of it. I see that the great Indian Peninsula Railway talk of it as not being so good by 33 per cent. as English coal; but it is very likely that they will come across a better coal; a coal that will be worth more.

3896. You know that near Jubbulpore the coal is confined to a single mine, and they have failed to find an extension of it?—I think they are getting a fairish quantity of coal certainly, but it is charged at a very high rate, and it is

Sir *George Campbell*—continued.

almost as dear, taking quality into account, as the coal which we carry 600 miles to Jubbulpore.

3897. Could you tell us what is charged for that coal?—I could not tell you off-hand. I think it is about nine rupees a ton.

3898. Do you think that the Government have managed their affairs well in having conceded the monopoly of this coal to a private company which charges this very high rate, and which has done, I may say, nothing in return for that advantage which has been conceded to them?—That is a matter which I cannot speak to.

Chairman.

3899. There was also a difficulty, I believe, at first in getting adequate European labour for supervision, and for purposes connected with the working of the railroads?—There was no difficulty in getting it; but it had to be sent out from this country, and was very costly. We relied almost entirely upon Europeans for everything connected with the working; all our drivers were Europeans, and our firemen as well.

3900. Taking these disadvantages into consideration, what has been the result of the working expenses of Indian lines as compared with English lines; I believe you have made certain comparisons in a paper which I have in my hand; perhaps you will give the Committee the result of your calculations?—I will take the East Indian railway which is the most important, and the most successful of the lines at present. The working expenses on that line are not one-third of those on the average of railways in the British Isles; that is to say, the cost of transport on the East Indian railway is less than one-third of the cost of transport in Great Britain and Ireland. In making this statement there are certain assumptions which I am obliged to make, because the English railways do not give you the necessary particulars. I assume that the average rate charged in England, is $1\frac{1}{10}$ *d.* per passenger per mile, and $1\frac{1}{8}$ *d.* per ton of goods per mile. Taking these charges the cost of railway transport here is, ·64 *d.* per passenger per mile, and $\frac{1}{2}$ *d.* per ton of goods per mile; that is the average of all the railways in Great Britain and Ireland. Now in India, in the year 1877, calculating on the same principles the cost of carrying a passenger one mile, varied from ·086 *d.* on the narrow gauge, South Indian line, that is to say, one-seventh of the English cost to ·227 *d.* on the narrow-gauge Rajpootana State line, or rather more than one-third the English cost.

Sir *George Campbell.*

3901. Is the South Indian of the same narrow gauge, 3 feet 3 inches?—Yes; the average cost of carrying a passenger one mile on nine Indian lines, covering in the whole 6,477 miles, was ·152 *d.*, or less than one-fourth the English average cost. The cost on the East Indian was $\frac{1}{8}$ *d.*, or less than one-fifth the English cost. The Indian figures, I should tell you, are exact ones; there are no assumptions in the matter; the Government keep passenger mile and goods ton mile returns, and you are able to get at the average cost of transport to a fraction.

Chairman.

3902. You commenced your calculation by assuming certain figures as regards English railways; but have you any reason to believe that

that

Chairman—continued.

that assumption is correct?—Yes; no doubt it is not absolutely correct, but I think the Committee can tell for themselves pretty much what the passenger rates are in this country. I have worked it out as well as I could, and I have come to the conclusion that the average passenger-rate taking return tickets, excursion tickets, and season tickets, and all things into account, would give you over $1\frac{1}{16}$ *d.* per mile; I think that seems reasonable.

Mr. *Sampson Lloyd.*

3903. We know that the ordinary third-class rate is 1 *d.*, but you increase it by $1\frac{1}{16}$ *d.* for second and first-class passengers; that looks as if it was rather less than more than enough; I make it to be less?—Then as regards $1\frac{1}{8}$ *d.* per ton for goods, I have asked different railway managers what they thought it was, and none of them seemed to know, or at all events if they did, they would not tell me. But some say not much more than 1 *d.*, some take it at $1\frac{1}{4}$ *d.*, some put it as high as $1\frac{1}{2}$ *d.*; I think from what one knows oneself and from information that one can gather, $1\frac{1}{8}$ *d.* per ton per mile would be less rather than more than the fact.

3904. How does that bear on the terminal charge?—It includes everything; we have no terminal charge in India at all events on the East Indian; I am taking all charges together.

Mr. *Balfour.*

3905. How do you deduce the cost to the railway from their charge to the public?—To do that I must take you through the whole of the figures. It is done regularly in all the Indian railways now they all keep their accounts in this fashion; and it is done also in America, but it is not done in England.

Chairman.

3906. Your assumptions are taken, are they not, from certain authorised figures published by the railway companies themselves?—The train mile cost is taken from their figures.

3907. Then, the general result of your calculations is that the cost of transport in India is very much less than in England?—Yes. The cost of carrying a ton of goods one mile in India varies from ·218 *d.* on the East Indian line, or about two-fifths the English cost, to ·74 *d.*, or half as much again as the English cost on the Rajpootana Government State line. The average cost on the nine lines in India taken before covering 6,477 miles, was exactly 3-8ths or 30 per cent. less than the English cost. Taking passengers and goods together I am justified in saying that the cost of transport generally in India is very much less than in England. On the East Indian line it is certainly not one-third what it is in England.

3908. What is the main cause of this difference in the cost of the two systems?—We only run as many trains as we can fill, or rather our theory is only to run as many trains as we can fill. We do not fill them as much as we ought to do, but still we get very much better loads than you get in England; for instance, taking the rates that I have assumed the average load, of an English passenger train is only 57 persons, and the average load on the little narrow gauge, South Indian line, according to the figures sent home, is no less than 342 persons. The average load on the nine

Chairman—continued.

Indian lines was 245 persons against English 57; that is to say, we only run about one passenger train to five that would be run in England.

3909. Are those nine lines, the average of which you have taken, all broad gauge?—Broad and narrow. I have taken the nine principal lines in India.

3910. Is there much difference between broad and narrow?—The odd thing is that it is the narrow gauge which has the best load. The Great Southern Indian line, which is a narrow gauge line, has a better average train load in its passenger trains than any of the broad gauge lines; it has 342 passengers on an average, the Eastern Bengal line having only 298.

Sir *George Campbell.*

3911. Do you know how many trains a day run on that Southern India line?—No more than they can fill; about two and a-half trains a day.

Mr. *Hardcastle.*

3912. What is the difference between the narrow gauge and the broad gauge; is the narrow gauge the English gauge?—No; what is called the broad gauge in India is 5 feet 6 inches, and the narrow gauge, is the metre gauge, 3 feet $3\frac{3}{8}$ inches; the broad gauge in England is 7 feet, and the narrow 4 feet $8\frac{1}{2}$ inches. On the Eastern Bengal line the average train load is 154 tons of goods, whereas the average in England at the average charge I have assumed is only 67 tons.

Sir *George Campbell.*

3913. Are you going to give us the rates on the mountain lines, as I may call them, the Great Indian Peninsular?—I could give you the whole of them, but I have not got them here. The average loads of goods trains on the nine lines which I have taken, which includes the Great Indian Peninsular, is 99 tons against 67 tons in England.

Chairman.

3914. Then the result of these calculations is that the working expenses in India of the various Indian railways are much less than in England?—They are; I should say that the cost of transport is very much less.

3915. Therefore I assume that they can afford to carry at a much cheaper rate?—Not only can they afford to do it, but they do do it. The average rate charged for passengers on the nine lines which I have taken, taking first, second, and third classes together, and the rupee at 1 *s.* 10 *d.*, is just exactly $\frac{1}{3}$ *d.* per passenger per mile, that is to say, less than one-third of the English rate. On the South Indian the average charge is not so much as $\frac{1}{4}$ *d.* per mile, taking all the classes together. A native third-class passenger is charged 2 pie, which taking the value of the rupee at 2 *s.* is $\frac{1}{4}$ *d.*

3916. The East India Company have recently reduced their rates, have they not?—We have gone on steadily reducing our rates for a long period. I think on the average the goods' rate now is 30 per cent. less than it was five or six years ago. But this is partly due to our carrying more of the lower classes of goods.

3917. Do the direction find that that policy answers?—Certainly; our traffic has been increasing

Mr. *Rendel.*

25 July 1878.

Chairman—continued.

creasing with enormous rapidity. We carry wheat now long distances at about ½ *d.* per ton per mile, and our average charge for all classes of goods is very little over 8-10ths of a penny per ton per mile, including all charges.

Sir *George Campbell.*

3918. Are you quite clear that the goods traffic does pay?—Our working expenses are 31 per cent. on the receipts.

3919. Taking the goods traffic as distinguished from the passengers you have no misgiving that the goods traffic pays?—I think last year our revenue was over 4,000,000, and that three-fourths at least of that was produced by goods traffic.

Chairman.

3920. In fact the great increase of dividend on the East India Railway is almost entirely due to the increase in their goods traffic?—Entirely; our passenger traffic is very dead; it rises very slowly indeed, and I am convinced that the cause of it is that our rate is much too high. We ought to charge the natives 2 pie instead of 3 pie a mile. We carry wheat and edible grains at about ½ *d.* a ton per mile for long distances.

Sir *George Campbell.*

3921. As against what rates for similar goods in England?—I do not know what grain is charged in this country. Coal, I suppose, would be a similar type of transport here, and I think coal is carried long distances here at ½ *d.* a ton per mile.

Mr. *Fawcett.*

3922. Are your figures at all effected by the exceptional receipts in consequence of the famine last year; are you giving the figures for a year which can be considered a normal year or an abnormal year?—So far as I have taken the whole of the lines of India, to a great extent they are abnormal, but so far as I take the figures of the East Indian Company's line, which is the most important, we consider that we have been by no means gainers by the famine.

3923. You said that three-fourths in value of your receipts was from goods; that might have been true last year owing to the exceptional receipts from the grain that you carried to the famine districts which would not be true in other years?—So far as this year has gone for instance, we have had very little falling off in our goods traffic.

Chairman.

3924. What the honourable Member for Hackney points to is the high price of grain in the South?—I think that if we had had any surplus it would have been exported to England; the grain simply took a different route.

3925. I think, in the annual report, Mr. Crawford, who was the chairman, laid great stress upon the increase in the wheat traffic being normal, and to a great extent independent of the famine?—Yes. The wheat trade is the great hope of that part of India; we are getting large exports of it to this country. If it is wanted in India, of course it is consumed there; but in normal years it would come to England.

3926. Are any of the other lines following in the steps of the East India, and reducing their rates?—Yes, I think they are. In fact, the other lines charge less than we do for passengers now.

Chairman—continued.

The East Indian average passenger rate is higher than that of any other lines, except the Madras.

3927. You, in your capacity, as consulting engineer of the East Indian Railway, and the State railways would strongly advocate the policy of reducing the rates?—I should, both on passengers and goods, but especially on passengers.

3928. From your experience, you are pretty certain that such a policy will ultimately prove remunerative?—Certainly.

3929. When I say remunerative, I mean more so than the system of high rates?—Yes; I am perfectly certain that high rates simply destroy the possibility of the railways being used.

3930. Of course, the East India is a very exceptional railway, and runs through a very rich and populous country; is there any danger of a system of low rates in a more difficult country on a narrow gauge not answering, or giving a satisfactory return?—No, I think not; because although we are better off with regard to traffic, we have cost a great deal more than any of the narrow gauge lines, and therefore they have a much smaller capital to pay dividend upon; but then, we do not run on the whole, through such a very rich country; a great part of our line runs through rather a poor country than otherwise. I do not call the Doab a rich country, and one-third of our line lies in the Doab; and then, I think nobody could call the Jubbulpore country a good country.

Sir *George Campbell.*

3931. Do not you call the North West a rich country?—We have a good collecting ground around us, but I do not think that I should call the Doab itself a rich country or a very populous country. That is a point upon which I have not much information. The bulk of our traffic does not come from the country immediately round the East India Railway. Of course we get a great deal of traffic from beyond; it is collected and comes in at Gazeabud from the Punjab, from Rohilcund, and Oudh, and so on.

3932. Does the Ganges Canal which waters the Doab, cause a great surplus of produce there?—That is a point which I cannot speak upon. We get a great deal of traffic at Cawnpore, which is brought to us in part by the Ganges Canal. I think a great deal comes down by canal to us at Cawnpore, and it there takes the railway and comes down to Calcutta.

Chairman.

3933. The cost of Indian railways, as a whole, is not one-half that of English railways?—As a whole, it is very much less at any rate. I can only speak in figures of the East Indian; the cost of transport on that line is certainly not one-third of the cost of English transport.

3934. As to the amount of work done by a locomotive, have you made some calculations upon that point?—Yes; our success is mainly due to our having a very small stock and getting a great deal of work out of it. I will only take the East Indian; I have not got the rest here, in fact. The East Indian altogether is about 1,503 miles long; at the end of 1877 its locomotive stock comprised 501 engines; its rolling stock comprised 982 carriages of all kinds, and 6,701 traffic waggons, varying in capacity from 6 to 10 tons. This stock proved more than adequate for the transport of 627,117,403 passengers, and 841,308,637 tons of goods one mile, besides mails and

Chairman—continued.

and the transport of materials for the use of the line, which would be 40 or 50 million ton miles more. I say more than adequate, because in consequence of the famine in Madras, that portion of the East Indian rolling stock running on other lines, principally in Madras, was always far greater than those portions of the rolling stocks of other lines running on the East Indian. During the year, therefore, each locomotive conveyed 1,052,130 passengers plus 1,679,259 tons of goods one mile.

3935. Have you made any calculation of what a locomotive, on the average, carries in England?—Yes. Taking the Board of Trade Returns, and taking also the assumptions that I had, as before explnined, to make with regard to the average rates of passengers and goods, each locomotive in England conveyed 470,000 persons and 570,000 tons of goods one mile. So that each East Indian locomotive carried twice as many passengers and three times as many tons of goods as a locomotive in England.

3936. That, no doubt, is due to their running fewer trains; and when railroads in their infancy are free from competition, no doubt a system of very few trains in the day may answer; but as the system extends, each railroad will have to encounter more competition, and will not it be necessary for them to increase the number of trains that run daily?—In the first place, I do not think we have approached the days of competition yet in India. The more railways you make the more traffic you will bring to the rest. In the next place, when the days of competition do come I should not compete by running more trains than are necessary for the traffic, but by lowering my rates; and by lowering my rates I should ensure more traffic.

3937. Do you think that the excessive competition which exists in England is more the result of the hap-hazard manner in which railroads were constructed, than the legitimate consequence of proper competition?—I think it is the result of the country being so rich that it will have what it wants, and it does not care at what cost.

3938. In India we should be free from that danger, should we not, if the Government had the control over the lines?—No. I think that the Government are just as likely to go wrong as the companies on a point of that kind; in fact, more so.

3939. By "control," I meant that no railroad can be started in India either by a local government or by a company without the consent of the Supreme Government?—That is well enough; but the time is too far distant yet to talk of too many railways in India. You want 30,000 or 40,000 miles of railway in India before you can begin to cry "Hold, enough."

3940. The further development therefore of the railway system in India will not heavily affect your figures by forcing the railways to run more trains daily?—No, except that it may bring so much more traffic that it may be necessary to run more trains. We have strong competitors; the River Ganges is our great competitor.

3941. Can you hold your own with the River Ganges?—We are beginning, I think, to hold our own. By lowering our rates we are trying to bring the traffic off the river on to the railway.

3942. A great portion of the wheat which is exported from Calcutta comes by rail, I think, and not by the Ganges?—I think a good deal comes by boat. When they are not pressed for time they will send it down the river, calling at our principal stations. If there is a market in Calcutta they will unload their boats at Patna. If they do not find a ready trade at Patna they will run down to Monghyr or Sooltangunj and unload there; but as soon as ever they get a market they seem to put their goods upon the railway and send them down to Calcutta as quickly as possible.

3943. The East India Railway runs almost side by side, does it not, with the Ganges?—Yes; it almost touches the river throughout its course from Allhahabad to Calcutta.

3944. So that it is the natural water way which the traffic can take advantage of if it wishes to do so?—Yes.

3945. Notwithstanding that, do you find that the tendency of the railway rather is to obstruct traffic from the Ganges, than the reverse?—Yes, I think that as we reduce our rates so we shall draw the traffic from the river on to the line.

3946. You have no fear if that policy is adopted of holding your own with the traffic on the Ganges?—Not the least.

3947. The figures which you have given us mainly relate to the East India Company; may we in so far generalise from them as to assume that the other railway companies may accomplish much the same result on a smaller scale?—Yes, I think so. I think that there are many of them, at all events, rapidly coming up to us.

3948. The net receipts from the railways are every year increasing?—Yes; and the traffic on the East IndiaRailway at the present time is considerably larger than the average traffic of the railways in Great Britain and Ireland.

3949. What conclusion do you arrive at from those figures; do you advocate a large application of capital to the extension of railways in India?—Yes.

3950. And have you any preference for any particular gauge, or do you think it would be advisable to supplement the Main Trunk system by a network of light railroads?—Yes; it has been my view that India was a country for two gauges; I should prefer the broad gauge for the great lines like the East Indian; but there are a number of other districts which want a railway, and yet which would not support a great railway; and for all such districts the narrow gauge is suitable.

3951. The Government of the North West Provinces, I believe, are elaborating a system of narrow-gauge lines?—Yes.

3952. Have you any cognisance at all of their proposals?—Yes, I had something to do with the starting of them. We have already made one little line, the Muttra and Hattras, which runs from the Hattras station on the East India Railway, down to Muttra on the River Jumna, a length of 29 miles. We have there laid a little railway which cost, I think, 3,300 *l.* a mile, including rolling stock, on the side of the road, like the Nulhatty; we took the Nulhatty as our type. There was very little cost of earthworks or bridges. In some cases we diverged from the road, and there we had to make a little bit of line; it was made upon the unmetalled part of the road; but there was not very much work necessary to make for it; it was merely earthwork, and so far as there was any earthwork it was very small,

Mr. *Rendel.*

25 July 1878.

Chairman—continued.

and the construction of the railway was exceedingly easy. But we had to buy our railway iron and our materials at a time when iron was so extremely costly that we paid, I think, 15 *l.* a ton for our rails.

3953. Is it not the case that the line to which allusion has been made by several witnesses is worked by natives?—Yes, entirely. There is a European foreman platelayer, but the locomotives are worked by natives, and worked very satisfactorily.

3954. Has not some local authority, the municipality of Muttra, some control over it?—I do not know how that is; I think that it has a voice in its management, but I fancy that the controlling power is the Government of the North West Provinces. There is some sort of consultative board of direction, I think, in connection with it; but the details of the management I am not acquainted with.

3955. Have you the figures in connection with the working of that line?—I have not got them here, but I believe I can tell you roughly about what they are. I heard when I was in India, I think, that the receipts last year from that line of 29 miles were about 10,000 *l.*, and that the working expenses were about 5,000 *l.*; but I think the Blue Books will show that.

Sir *George Campbell.*

3956. Can you tell us the effect of that line upon the road traffic; will it be possible to continue the road traffic at the same time?—Yes, I travelled over the line three or four times myself, and, of course, took notice of it. I have seen bullock carts travelling on it just the same; I ran over the 29 miles myself in one hour and a quarter, and we frightened nothing, nothing that I could see; everybody took it very quietly, horses, camels, and bullocks.

Chairman.

3957. Does the line pay more than the interest on the sum borrowed for its construction?—I think it is just paying the interest upon it. I think they said they hoped to pay 5 per cent. last year, the money having been raised at 4 per cent.

3958. Then it has been a success?—We consider that it is a great success. I happened to be going over it with General Strachey and Colonel Fraser, and we three being responsible for it, we congratulated ourselves that we had done a very good thing.

3959. I suppose it is on that model that you would propose to construct other lines in the North West of narrow gauge, and worked by natives as far as possible?—Yes, that was my idea in advocating the introduction of the narrow gauge railways in India.

3960. Have the North West Government made any proposals?—Yes, I think they have settled on the construction of a considerable length of the same type of line in the North Western Provinces.

Mr. *John Cross.*

3961. How is the money raised for this railway that you have been speaking of?—It is raised, I think, mainly on the guarantee of the local government.

Chairman.

3962. The other railways are to be constructed by the State, without any local guarantee, are they not?—No, I believe the North Western Government is going to undertake the whole of them themselves. I think that is the plan which they have settled upon now in India, that the provincial governments shall undertake these lines so as to relieve the Central Government of a great deal of labour which now presses upon it, and which is consequently not as well done as it might be done.

Chairman—continued.

3963. Do the local governments, generally speaking, give a guarantee to pay the interest?—Yes, I think that is the plan which is to be adopted.

3964. The general purport of your evidence is, that you think that there is a great future for the railways of India, inasmuch as their carrying power is considerably greater than that of the English lines, and that, therefore, they may be expected to give a higher return?—Yes. I say, generally, that taking a line like the East Indian, it has cost half what a similar railway in this country would cost, and it has fully three times the capacity for traffic; that is to say, the English system is one which minimises the capacity of a railway, and the Indian system is one which makes the best of it.

3965. Has the East Indian Railway been sufficiently long in existence for you to be able to ascertain what the annual deterioration of the permanent way is?—The first part of the East Indian line was opened in the year 1853, and the average age of the line is now about 15 years; so that, I think, we know the worst of everything.

3966. I believe the directors pride themselves upon the fact that there is no line in the world the permanent way of which is in better repair?—That would be going a little too far, perhaps; but the Government officers make no complaint against us, except in one district, which was allowed to get a little bit down, as it is called; but that is being put right now.

Sir *George Campbell.*

3967. Is the fencing upon the Jubbulpore line complete yet?—I think it is at last.

Chairman.

3968. Is there anything further which you wish to add to your evidence?—I have got here some figures which I think the Committee might like to see in an Appendix. I thought that the best way of giving you an idea of the capacity of an Indian railway was by comparing it with something, and I have compared it with the capacity of English railways. (*The Witness delivered in a Memorandum.*)

Mr. *Onslow.*

3969. I suppose, on the whole, you look upon this Hattras and Muttra light line as a success?—Yes, I think it a very decided success.

3970. Are there many other roads on which, within your knowledge, you could so successfully run such a light railway?—I cannot say that of my own knowledge, because I have not been much upon the Indian roads; but I am informed by those who do know, that there is a very large extent of road which may be so used, and which is intended to be so used.

3971. You have been on the Nulhatty light line; that line is very undulating, is it not?—Yes; they had better have spent a little money in levelling it a bit.

Mr. *Onslow*—continued.

3972. Have you found that the Muttra and Hattras line is not so undulating?—I think it is a dead flat the whole of the way, or very nearly so; at Muttra we have a piece of 1 in 300, or something like that.

3973. In a famine-stricken district do you consider that a light line, such as you have now between Muttra and Hattras, would be a great benefit to the country for the transport of grain?—Very great indeed.

3974. What amount of grain tonnage do you think, in a case of necessity, could be sent daily from the main line to Muttra from Hattras in case of famine?—I have no doubt that you might dispatch 700 or 800 tons a day with a single line, if you put the whole appliances of the line to work, and had sufficient rolling-stock. On that line we have only got four locomotives and, I think, 40 or 50 carriages, because we do not want more at present.

3975. I am dealing with the present state of circumstances; how would it be now?—You could not do that with the present state of things. It is a question of putting on carriages enough for the purpose; but so far as the line is concerned you could carry pretty well any quantity you desired.

3976. In case of a famine would you have in store a sufficient number of carriages to put on?—Not unless you had a very large length of line.

3977. At the present time you have only four locomotives on this line. Supposing there was a famine in that district, how soon do you think you would be able to put four more on?—I think I might say in four days, because it is close alongside the Rajpootana line, which has a very large stock of its own.

3978. But the locomotives on a light railway are very different from those on a main line, are they not?—No; the Rajpootana locomotives could run very well indeed upon this line.

3979. You would recommend to the Committee as a prevention of famine that there should be an extension of these light lines throughout India?—I cannot say that I have considered the subject from a famine point of view.

3980. Have you any experience of the southern lines in India?—Only such experience as one gets from running over them.

3981. From your own knowledge, do you believe that light lines on the southern lines in India would be feasible?—The Great South of India line is nothing but a light line; it is a metre gauge railway, constructed as cheaply as possible. I do not think it has cost more than about 7,000 *l.* a mile.

3982. Still it is a main line?—Yes, you may call it a main line, if you will, but it is a main line, and a light line. It is constructed to carry locomotives with only three tons upon the wheels, or what we call generally the metre gauge standard; that is, the same standard which we propose for all the metre gauge lines.

3983. For the extension of the general traffic of India, would you recommend to this Committee an extension of the light lines?—Yes, I should.

Mr. *John Cross.*

3984. I think you said that a large traffic comes down to Cawnpore by canal, and after that comes on to your railway?—Yes.

Mr. *John Cross*—continued.

3985. That, of course, diverts the traffic from the river, more or less?—Yes, I suppose it would go by river if it did not go by rail.

3986. Could you tell us the comparative cost of bringing it by river and by rail from that point to Calcutta?—No, I cannot, except in this way, that it pays the producer to carry it by railway. We charge him from Cawnpore to Calcutta, I think it is, 6*s.* 3*d.* a quarter.

3987. You do not know whether that is less or more than they can carry it for by boat?—I should fancy it was more; but they have the advantage of the railway speed and certainty, and that makes up the difference; otherwise I assume it would go by water.

3988. Have you any statistics as to the quantity of any particular commodities coming down the River Ganges and coming by your railway?—No, I have not got that.

3989. You have there a considerable traffic both ways, have you not?—Yes; and, oddly enough, I believe it frequently happens that we have a larger traffic up from Calcutta than we have down.

3990. Then, by reason of that, you utilise your rolling stock better than we do in England?—Yes, I think so; that is true, at any rate, so far as the mineral traffic of this country is concerned, but I do not suppose it is true so far as the goods traffic is concerned; we send coal up the country in the waggons, which bring down grain.

Mr. *Hardcastle.*

3991. You stated that the cost of Indian railways was half that of English railways, and that the capacity was three times that of English railways; what do you mean by "capacity"?—Referring to the East Indian line again, we carried last year 1,143 passengers, and 1,534 tons of goods over every mile of line every day, on the average, and we did that with eight trains, running on the average every day over every mile, whereas in England 960 passengers, and about 1,100 tons of goods, were carried over every mile on an average by 17½ trains. It is quite plain that if you can run 17½ trains in England you can run 17½ trains in India, and with the 17½ trains we should have carried nearly three times as much as was carried in England. Therefore, assuming that the English lines were doing as much as ever they could, we could do three times as much.

3992. With regard to the cost of Indian railways as compared with English railways, is not the difference in the value of the land a very material item indeed?—Yes, of course; and there are other reasons why they are cheaper.

3993. Is the cost of construction, apart from the value of the land, greater in India than in England?—It is cheaper on the whole because the works are less. There is another thing which is very much cheaper in India, that is to say, we require very little station accommodation in proportion to what is required in England, because the quantity of traffic which we carry is small as compared with the quantity of English traffic, and the distance which we carry our traffic is five or six times greater than in England. We have small quantities carried long distances, and in England you have large quantities carried short distances; and consequently you require in England a very much larger amount of station accom-

Mr. *Rendel.*

25 July 1878.

Mr. *Hardcastle*—continued.

modation than we require in India, because station accommodation is governed by the quantity brought to the stations, and not by the distance carried.

3994. Can you tell the Committee what the earnings of the East Indian line now is; I understand that the East Indian line is guaranteed by the Government 5 per cent., and that something is earned over and above the 5 per cent.; what is that earning?—Last year, the nett earnings of the East Indian Railway were about 2¾ millions, that is equivalent to about 98 per cent. on the whole capital of the line. The shareholders receive 5 per cent. guarantee and half the surplus, the Government getting the other half. The result was that the Government received from us about 640,000 *l.* as their share of our surplus.

3995. That is, in point of fact, replacing the capital which the Government had expended in the shape of interest before the railway was productive?—Yes.

3996. Can you tell me at all how much the Government lost by guaranteeing that amount of interest; in other words, how much was added to the cost of the railway to the Government by that guarantee before the railway began to pay?—I think the difference between the interest which the Government paid out and the revenue which we paid to the Government is about five millions at the present time.

3997. And that is being gradually reduced by these repayments every year?—Yes, I believe so. There is a question of interest which has to be considered; and I believe that if the interest is taken into account, we are just keeping down our debt and a little more. There is simple interest to be calculated by the Government on their advances to us which we shall have at some time or other to repay.

3998. With regard to the native engineers employed upon the light railways which you spoke of, how do you think they compare in their capacity for managing their engines with English engineers?—They do their work very well. I may say that the East Indian Railway has now upwards of 150 drivers in its employ.

3999. I understood you to say before in your evidence in chief that the drivers and firemen were all Europeans?—Taking all the railways in India, nine-tenths of them are. There are some Parsees employed on the Great Indian Peninsula line, and it is only within the last two or three years that we on the East Indian have introduced native drivers.

4000. Are you increasing the proportion of natives?—Continually, as fast as the Government will let us.

4001. Do you find that they accept lower wages than Europeans?—Yes, they get paid about one-tenth. We pay a native driver about 18 rupees a month, where a European would receive about 200; and he is quite as good a man.

4002. What do you mean by "as fast as the Government will let us"?—About a year ago the Government objected to our dismissing our European drivers. They said that we were making an addition to the loafers of the country, and they rather put a check upon us. We protested, and I think the Government are now satisfied that we were only doing what we were quite justified in doing.

Chairman.

4002*. That objection on the part of the Government was not so much to the employment of natives as to your turning off a lot of young Europeans?—Yes. I think it was a little bit hurriedly done on the part of the Government; they had better not have interfered in the matter.

Sir *George Campbell.*

4003. Was the objection that of the Government, or that of the European public?—I should think the latter had something to do with it.

Mr. *Hardcastle.*

4004. What proportion does the 150 drivers bear to the total number of drivers?—It must be very nearly one-fourth. That is speaking rather loosely, but it must be something like that I know, because we have only 500 engines.

4005. Do not you import any more European drivers now?—I have not sent out any European drivers for some four or five years.

4006. Do you contemplate that, at no very distant date, you will be able to manage exclusively with native drivers?—Yes, we hope so, as soon as ever the European public are satisfied that any one can safely go behind a native driver. We are not allowed to use native drivers upon passenger trains yet, and I think there are some restrictions put upon them with regard to goods trains. In fact, we are feeling our way in the matter. We saved last year, I believe, 15,000 *l.* by using native drivers.

4007. Am I correct in saying that a native driver is as good a man for the purpose as an Englishman?—Yes, I think he is; of course, at present, we are very careful. Whether when we have native drivers generally we shall be as careful in their selection as we are now may be a question.

4008. With respect to native engineers, have you come in contact with native engineers who have been educated at Roorkee College?—No, I never have. We have never employed any that I know of. We have native draughtsmen in the engineer's offices, and we have natives, also, in the head-quarters at Calcutta, in subordinate positions; but we have very few native permanent way inspectors at present; we do not seem to have created them so far.

4009. Is that the heaviest kind of work on railways?—No; I think it is more because we thought we ought to have Europeans than anything else, because every European in India thinks there is nobody like a European. We do not look for the natives as we ought to do; we do not search them out and induce them to enter the service.

4010. Do you find that in the capacity of draughtsmen they are quite equal to Europeans?—They are excellent draughtsmen.

4011. As regards their physical strength for a heavy class of work, do you think they are equal or superior to Europeans?—An inspector of way has not anything to do with heavy physical labour. It is the system of men taking bribes which makes it so very difficult to employ natives; the system called dustooree, all over the country.

Sir *George Campbell.*

4012. Dustooree is a system not unknown out of India, I believe?—No, I am afraid it is not.

4013. Do

Mr. *Hardcastle.*

4013. Do you think an engine driver will take a bribe?—He would take a bribe, I daresay, if he could get it. An engine driver is not favourably situated for that, but a man who has to pay others is.

Mr. *Balfour.*

4014. Have you got any figures which will enable us to compare the traffic accounts of canals and railways together?—No, I have no information upon the subject of canals.

4015. The only informatiou which you have is derived from observation of the rivalry between the East Indian Railway and the Ganges Canal?—Yes, that is all that I know, and I merely know that from the railway side of the question.

4016. Do you know whether even that is a very favourable example of carriage by water?—No, I do not.

Sir *George Campbell.*

4017. Does the Ganges Canal at all compete with the railway in the Upper District?—No, I think it brings us traffic down to Cawnpore, where, instead of going on to the river, it goes on to the rail and comes down to Calcutta.

4018. From Saharanpore to Cawnpore does not the Ganges Canal rival you?—I have not heard that it does so. We get a great deal of traffic from the direction of Saharanpore by the Scindh, Punjab, and Delhi.

4019. As regards the cost of Indian railways as compared with English ones, I think you said with regard to the East Indian line, that the cost of construction was about one-half what a similar railway would have cost in England?—The East Indian line has cost about 20,000 *l.* a mile, and I think you could not say that a grand trunk line like that in England would cost less than double that sum.

4020. Taking the railways generally throughout England and the railways throughout India, would you say that the cost of construction in India is not above half?—I should say so.

Mr. *John Cross.*

4021. Does not that include the cost of land?—It includes everything. Land, of course, in Inda, is comparatively valueless.

4022. If you deduct the price of the land in each case, would not the cost of construction be very similar in India and in England?—No, it would take a great deal more to make a railway in England.

Sir *George Campbell.*

4023. As regards the cost of the working, I observe that the reasons you gave for the superior economy of working in India are what I may call administrative reasons; that is to say, you are able to run fewer trains and to carry a larger number of passengers in your trains, and so on; that, I suppose, may be attributed to the absence of competition, and to the less exacting character of the public in India; but putting aside those considerations, and looking to those of a merely physical character, are you of opinion that railway transport may be worked at a much cheaper rate in India than in England?—Yes, I think the adhesion of the locomotive in India to the rail is much better, on the average, than in England; and consequently you get a better result out of it. You can carry a heavier train load on an average in India with the same power than you can in England on a similar gradient.

Sir *George Campbell*—continued.

4024. You have told us that the fuel costs, on an average, about three times as much in India; is not that a very heavy item in the cost of working a railway?—It is one item and a largish item, but not a very heavy item.

4025. Do you see reason to apprehend that in some parts of the country that is a difficulty which will increase very much; for instance, as regards the working of the Punjab lines, where there is no coal within many hundreds of miles, and where there has been reason to suppose that the fuel of a comparatively woodless country is being exhausted, do you see any great difficulty in the future as regards the fuel for working the lines at the extreme north and the extreme south of India?—No, I think not; Kurrachee can always be reached from England, and you ought to be able to get coal at Kurrachee at 30 *s.* a ton. The Northern Punjab line is now supplied with fuel from the East Indian coal found at Kurhurballee.

4026. Is it not enormously expensive to get the Kurhurballee coal to it?—It is about 2 *l.* 10 *s.* a ton, I think; it is a question of what we charge for its carriage. You can see what it might be. It costs 5 *s.* a ton at the pit's mouth; and then if you add a thousand miles of carriage to that, at the rate charged, and you get at the price of the coal.

4027. Are you satisfied that the Kurhurballee coal mines will last for our time at any rate?—I have every reason to suppose so. We see no probability of their being exhausted.

4028. I think most of the statistics which you have given us are regarding the East Indian line and the Eastern Bengal line, which are both exceptionally favourable; but, taking the other railways in India also into consideration, do you still consider that the railways are more cheaply constructed, and more cheaply worked, in India then in England?—Yes, I should say that the most unfortunately placed railway in India would be worked more cheaply than the average of lines in England.

4029. I think you said that the great difficulty was with reference to the bridges, and that up to this time mistakes have occurred with regard to those bridges; do I understand you to say that you are satisfied that for the future great difficulties with regard to the bridges are not likely again to occur?—I think not. I think we have learned our lesson. We know how to treat the rivers now. In the Punjab the bridges have been made quite safe, and so have all the bridges which have been constructed by the Government. I do not think we need fear them.

4030. Have not rivers in the great alluvial plains a tendency to raise their beds, so that after a time they make for themselves a totally different course?—I should say we are safe against that for a hundred years at least.

4031. As regards the Soane bridge, is there no fear that the Soane may burst into the Ganges some half-a-dozen miles above the present bridge?—I think not. There is some question whether the canal works there are not doing the line some mischief; but there is no reason to suppose that the Soane bridge is not perfectly safe.

4032. Take the case of the bridge over the Sutlej at Loodiana; it has been necessary to extend that several times, has it not?—It has been broken, I think, but they have learned how to protect the work now.

Mr. *Rendel.*

25 July 1878.

Sir *George Campbell*—continued.

4033. On which part of the Sutlej bridge is that; is it on the Loodiana side, or on the other side, or in the middle?—I do not recollect the exact position.

4034. Are you confident that you can control the Sutlej, so that it shall always run under the bridge?—Yes; it is a question of works. There has been a very heavy expenditure in training the bank of the river above and below the bridge.

4035. But you are very confident that it can be done?—Yes.

4036. The coal mine near Jubbulpore, I think, is the only case in which the coal fields of India have been given away to a private company?—Unless you say that the Kurhurballee coal has been given away to the East Indian Company, but that is only under a lease from the Government to the railway company, which is terminable.

Mr. *Hardcastle.*

4037. Do not the Government have a royalty?—Yes, we pay a royalty to the Government; we pay rent and royalty, and, I think the Government make a very good thing out of it.

Sir *George Campbell.*

4038. When you claim such favourable results of the working of the traffic say of the East Indian railway as compared to English railways, it is the case, is it not, that a very much larger proportion of the Indian passengers are third-class passengers, and that they submit to be packed like herrings in a way which the Englishmen would hardly submit to?—The average number of passengers in a carriage when I last examined the subject was only about 14, the capacity of the carriage being for 60 persons; so that I do not think there can be any complaint of packing.

4039. Does that observation apply not to third-class carriages alone, but to the carriages taken as a whole?—No, it applies to third-class carriages taken separately.

4040. You have told us that the Southern Indian line is the most profitable line in respect of cheapness of working, and that the Rajpootana line is the dearest; can you give us any reason for the extreme discrepany between those two lines, which are both narrow gauge lines?—No, I cannot. One belongs to a company, and the other belongs to the Government, but I am not prepared to say that that has anything to do with it.

Chairman.

4041. The company run much more cheaply than is the case on the line worked under Government?—Yes.

4042. Are the nett receipts on the Rajpootana much higher than they are on the Southern Indian line?—No, I think not.

Sir *George Campbell.*

4043. Have you examined the traffic receipts of the Rajpootana Government line?—No, I have not gone into the details so as to be correct. I have only taken the figures sent home.

4044. You cannot give us an opinion as to whether the profit which they claim is fairly earned?—I have no doubt that there is nothing in the shape of cooking in any of those accounts.

4045. As regards the narrow lines, can you tell us what is the gauge of an ordinary cart or carriage in this country?—I think it is about five feet; that is the Prussian cart gauge, I think, and I think ours is about the same.

Sir *George Campbell*—continued

4046. Is there not an almost extraordinary coincidence throughout the world in the gauge which is used for ordinary carts and carriages?—Yes, I think there is, and that is why it is resting in my mind, some how or other, that the Prussian cart gauge is five feet and the English is the same.

4047. Is it not your impression that as there has been such a coincidence throughout all nations of the world as regards the gauge for carts and carriages, there must be some important advantage in that gauge?—I do not see why. There does not seem to me to be any connection between the two subjects.

4048. Do you yourself see any advantage in making railways upon a gauge much narrower than any which is used in any country for ordinary carts and carriages?—Yes, I think I do. There is no question about this, that those narrow-gauge lines are constructed, as a whole, much more cheaply than the broad gauge.

4049. Is the 3-feet-3 gauge constructed very much more cheaply than a 4½-feet gauge?—Yes, I think it is, taking all things into account.

4050. In your opinion, are there any great trunk lines which still ought to be made in India?—I could not speak generally as to that.

4051. Do you think there is any want of a great trunk line to connect the north with the south of India?—No; I do not know of any traffic at present which would justify it. You have a great trunk line connecting northern with southern India at the present moment; that is to say, you can go in a direct line without a break either of rail or gauge from the Jhelum to Madras.

4052. Is it not necessary in doing so that you should traverse about double the distance that a direct line would take?—Not, I think, double, or anything like it. The Dhoud and Maumad line now cuts off the ghats on the Bombay side.

4053. As regards the employment of natives, is it your experience and belief that for a work requiring a great deal of physical vigour and a good deal of nerve, and an absence of carelessness and recklessness, you can confide that work to natives when they are sufficiently trained, as confidently as you would to Europeans?—I think I may say that we are entirely satisfied with the native drivers, and that, I suppose, is as strong an instance as you can have.

4054. Of what class of people are the native drivers?—We have them of all classes, but they are very largely Chittagong men, Lascars.

4055. Are they Mahomedans?—Yes.

4056. What is the duty of a platelayer; he does not lay plates, does he?—No; a platelayer looks after the maintenance of the permanent way.

4057. Are you quite satisfied that the great mass of your drivers may eventually be natives?—Yes, quite.

4058. Do you think that in that event the permanent way may be for the most part entrusted to natives?—Yes; I hope we shall get to use native inspectors of the permanent way, and I hope to see native guards; but it is difficult at present from their want of education.

4059. Is not the difficulty of employing native guards, to some extent, connected with the dealing with European passengers?—I think that possibly the traffic manager is opposed to the use of

Sir *George Campbell*—continued.

of the natives in that position, and that was something to do with it.

Mr. *Fawcett.*

4060. You said just now, with regard to the employment of native drivers, that you were employing 150 this year; how many did you employ before?—I think it is only within three years that we have been employing them at all.

4061. And I think you said that, in consequence of employing those 150 natives instead of 150 Europeans, whose place they took, there is a saving of 15,000 *l.* a year to the company?—I think there was if the figures were taken out.

4062. Therefore, according to those figures, you can get native drivers cheaper than Europeans, and each native driver that you employ represents an annual saving of 100 *l.*?—We pay the native driver 18 rupees a month, and we certainly paid the European whom he replaced 180 rupees.

4063. Therefore you paid him ten times as much?—Yes, fully ten times as much, and the native does more work. He works longer hours and he gives less trouble.

4064. Having in view the economic carrying out of public works the greater employment of native agency is a practicable ingredient and a source of most important saving?—Yes.

Mr. *Fawcett*—continued.

4065. You, of course, pay the natives what you may consider the fair native price for their labour?—Yes.

4066. Do they consider being employed at 18 rupees a month good employment?—Yes, very good indeed.

4067. Therefore, in considering the question of public works paying, this saving is so very great that a public work in India, a railway, say, as to which you are giving your evidence, may not pay the interest on the capital if it was worked chiefly by European agency, but may become very profitable if chiefly worked by natives?—Certainly.

4068. And you look forward confidently to the time when, by gradual steps, natives may, to a very much larger extent, take the place of Europeans?—Yes.

Sir *George Campbell.*

4069. And that is much more so in the case of railways in that country than in the case of other public works, is it not?—Yes; but then, of course, no other class of public works employs so many men as the railways.

Thursday, 1st August 1878.

MEMBERS PRESENT:

Mr. Agnew.	Mr. Fawcett.
Mr. Ashbury.	Lord George Hamilton.
Mr. Childers.	Mr. Sampson Lloyd.
Mr. John Cross.	Sir Joseph M'Kenna.
Mr. Grant Duff.	Mr. Onslow.

LORD GEORGE HAMILTON, IN THE CHAIR.

Mr. JULAND DANVERS, called in; and Examined.

Mr. *Danvers.*

1 August 1878.

Chairman.

4070. YOU are, I believe, Government Director of the Indian railroads, both State and guaranteed?—I am Government Director of the guaranteed railway companies in this country. I have no recognised official connection with the State lines.

4071. How long have you held this post?—I was appointed in 1861, in succession to Sir James Melvill.

4072. But your Report deals with the Returns of the State railways, does it not?—It does.

4073. The Committee were anxious to have some information as to the financial results of the expenditure on railroads. Perhaps you will give us the latest information, both as regards the capital and the revenue account, taking first the guaranteed railways, and then the State railways?—Last year the total net receipts from the railways amounted to 6,232,888 *l.*, and the capital expended was 113,345,000 *l.*

4074. That is the net receipt?—Yes.

4075. Could you give us the figures for the preceding years?—I can at once give them for five years previously. In 1872 the net receipts were 2,869,223 *l.*, and the capital expended was 90,009,622 *l.*

Mr. *Fawcett.*

4076. Was that guaranteed and State both?—Guaranteed six years ago. The average receipts per annum on the capital increased in six years from 3 *l.* 2 *s.* 4 *d.* to 5 *l.* 5 *s.* per cent.

Chairman.

4077. Could you give us the figures of the intermediate years, between 1872 and last year?—In 1873 the capital expended was 91,686,000 *l.*; and the net revenue was 3,185,000 *l.*; in 1874 the capital expended was 92,417,700 *l.*, and the net revenue 3,956,000 *l.*; in 1875 the capital expended was 92,786,426 *l.*, and the net revenue 3,576,500 *l.*; in 1876 the capital expended was 93,720,700 *l.*, and the net revenue 4,437,000 *l.*; in 1877 the capital was 94,272,200 *l.*, and the net revenue 6,117,220 *l.*

Chairman—continued.

4078. Those figures which you have just given us, I think, only include the capital of the guaranteed companies?—Yes.

4079. They do not include the returns of the State railways?—No, simply the guaranteed railways.

4080. Whereas the first figures which you gave us included both?—Yes, those for last year, which I first gave, did. There had been very little expended on the State railways previous to 1872, and the returns of course were insignificant, inasmuch as hardly any were open.

4081. But still, as since 1873 a sum averaging about 3,000,000 *l.* annually has been spent upon State railways, if you included that in the capital account, it would reduce the per-centage of the return, because the greater proportion of this capital which has been expended in State railways has not been earning income?—Of course it would. In the last figures I gave I did not give the per-centage; I simply gave the net revenue; and the capital which I gave applies simply to guaranteed railways.

4082. Previous to 1872, I believe the anticipations as to the railway returns had not been realised; but since then there has been a very rapid development and increase of railway traffic and receipts?—Yes; it has been gradual, but I should not say rapid until the last year; there was a great jump between 1876 and 1877.

4083. But the per-centage of return between 1872 and 1877 has increased from 3 *l.* 2 *s.* 4 *d.* to 5 *l.* 5 *s.*, which is an enormous increase?—That was because last year was a very prosperous one.

4084. Then you think that last year was rather abnormal?—It was.

4085. But still, making allowance for the exceptional nature of the returns of last year, you think that there would be a steady increase in the railway returns?—There has been a steady increase.

4086. And that if you take the per-centage upon the whole of the capital expended, that is including the guaranteed and State railways, you believe

Chairman—continued.

believe that each year we shall get a better return?—I do.

Mr. *Fawcett.*

4087. Not a better return, I presume, than last year?—When I say I expect a better return, I mean in the ordinary way. Of course an exceptional year may occur which might give an excessively high or low amount of revenue; but speaking generally, I think that the lines are all improving, and that the receipts will increase and produce a better revenue each year.

Chairman.

4088. Have you got the returns connected with the capital expended on State railways, and the revenues derived from them?—Yes, I have.

4089. Could you tell me what the total amount spent on State railways down to your latest returns is?—Up to the end of October last, which is the latest date up to which we have returns, the total amount expended was 17,661,600 *l.*, and the net receipts last year from the State railways were 141,356 *l.*

4090. Then out of the 17 millions, I assume a far greater proportion has been expended upon railways which are not yet in working order?—A large proportion.

4091. The Rajpootana line, I believe, is the latest State railway which has been opened. Could you give us any figures concerning that?—The Rajpootana line is the latest State railway from which one can form anything like a fair judgment. Other lines have been opened since, for instance, the Punjab Northern, the Indus Valley line, and the Northern Bengal, and so on, but the Rajpootana line is the only line from which you can draw any satisfactory results, and the net receipts from that line last year were 85,770 *l.*

4092. What was the capital expended?—The capital expended was 2,680,000 *l.*

4093. How long has this line been open?—About two and a-half years.

4094. And therefore, according to these figures, it has already begun to earn a return very close upon 4 per cent.?—Yes; towards that.

4095. Objections, I think, have been taken by one or two of the witnesses to adding the capital both of guaranteed and State railways and lumping them together; if you were to separate them, and take the per-centage upon the sums expended, you would get a fallacious return, because the whole of the guaranteed capital is now engaged in earning returns, whereas a very great proportion of the State railways have not yet begun to work?—That is quite true, but it has been the case throughout the whole of the railway operations for a great portion of the time. Many of the guaranteed lines have at various periods not been completed, and yet the capital expenditure on the finished and unfinished lines has always appeared, and the net revenue has been calculated on the total amount raised.

4096. The system hitherto had been, up to within a very few years, that of taking the total sum expended upon the guaranteed railways and putting against that expenditure the revenue derived from all the guaranteed railways?—Quite so, if you say *raised* instead of *expended.*

Chairman—continued.

4097. Therefore, so long as the guaranteed system was the only system by which railways were constructed, there was always a certain portion of that capital which was not earning revenue?—Exactly.

4098. But now that that system is brought to a close, and the whole of their capital is earning revenue, that portion of their capital which otherwise would not be earning revenue is comprised under the head of State railways?—Just so.

4099. Therefore, if you were to divide them and keep separate the guaranteed from the State railways, you would get quite a misleading return; that is to say, you would get a misleading return if you, from the results, drew a comparison between the respective merits of the two systems?—Quite so.

4100. Have you any strong opinion as to the comparative merits of the two different systems; whether it would be preferable to continue to employ the indirect agency of companies upon whose capital a guarantee is given, or whether the present system of the State directly constructing railways is the more economical and effective?—I have always held the opinion that it was a wise measure in the first instance to employ railway companies for the purpose of introducing railways into India; I do not think it could have been done under any other system, but I think the time has arrived certainly when the State may take the construction of those works into its own hands, and I can see no reason, theoretically, why they might not be managed equally well; but I confess that at the present moment I do not think that it would be wise in the Government to attempt to take any very large additional extent of railway into their management for the purpose of working them. Construction is a different thing. Money may be raised, as has been shown in the past, more economically directly by the State rather than through companies. There have been instances, it is true, when a company has been able to raise money and the State has failed, showing that sometimes it is desirable to have two strings to your bow; but in the long run there is no doubt that the money raised by the companies might have been raised at a lower rate if it had been raised directly by the State; but when you come to the expenditure of money I think it is a different thing; I am talking of the past; I think that the Government certainly would have failed in expending money economically and properly. The history of public works in India shows how many of them have been stopped in the middle of their course, and how much has been wasted simply by the suspension of operations. Money has not been forthcoming when it has been required for other objects more pressing at the time, and the consequence has been that contractors have been sent to the right-about, the works have deteriorated, and there has been a great waste of expenditure in that way; but a direct system ought to have the advantage of more direct responsibility, and it is free no doubt from the objections of the double Government. With regard to the works now going on in India, they seem to have been conducted, I think, with great care and circumspection, and upon the whole the railways in the

Mr. *Danvers.*

1 August 1878.

Chairman—continued.

hands of the Government have been constructed well, but I certainly have heard of complaints of interference in details, and of the want of funds at particular times, which of course impeded the progress of construction and disheartened men who were anxious to get on with their work. This has an injurious effect, I think. It may have occurred simply because Government was new to the work, and the thing was not so well understood, but there is no reason why a system should not be introduced by which those objections should be overcome, but I do not think at the present time that they have been. I would allow the existing state of things to go on, permitting companies to make short branches and extensions when needed, so as to complete their systems; and continuing the State and provincial lines steadily but cautiously.

4101. Then the main advantage of the guaranteed system was, that it did secure a continuous application of capital to the construction of railways, when the State had made up its mind to construct such-and-such a line?—That was one great advantage in the system, no doubt.

4102. As regards the working expenses, an insinuation is sometimes made, I do not know whether it is true or not, that if a company had a high rate of interest guaranteed upon their capital, and their net receipts are not likely to exceed that interest, they become somewhat careless about their working expenses, and it is only when their receipts exceed the guaranteed interest, and the shareholders begin to taste the sweets of a surplus dividend, that they properly look after their working expenses; is there a very great difference now between the working expenses of those companies who earn surplus profits, and of those whose receipts do not meet the interest guaranteed by the State?—There is a considerable difference, no doubt, but I should not say that it arises from the cause which you seem to have in your mind. I have never found any indifference on the part of a company to their working expenditure. I must say that I have always found them anxiously desirous of keeping down the expenditure. It was intended, of course, that it should be a stimulus to economy and to exertion on the part of the companies to allow them to participate in half of the excess profits, and the shareholders are very keen, of course, to receive this advantage, but in the practical working of the system, I confess that I have not seen, either here or in India, any indifference to economy.

4103. Therefore you would attribute the low per-centage of the working expenses of an East India line, compared to their gross receipts, rather to exceptional circumstances than to the cause which is rather insinuated?—I would attribute them partly to local advantages, but I would also attribute them to good management. But how far the good management has been produced by the hope of gain, by the expectation of an extra dividend and participation in profits, or how far by energy and skill exercised in the course of duty, I cannot exactly say. Both probably had something to do with the result.

4104. My question referred simply to the per-centage of the working expenses to the gross receipts; is there any difference in the expense per train mile between the revenues which they

Chairman—continued.

earn and the surplus profits of those whose receipts do not equal the guaranteed dividend?—Not always, as the following figures, taken from my last report, will show.

Total Working Expenditure for the Year 1877.

Railway.	Gross.	Per Train Mile.	Per Cent. of Gross Receipts.	——
GUARANTEED.	£.	s.		
East Indian, Main Line.	1,136,223	2·89	31·22	This line has frequently paid above the guarantee.
Ditto, Jabalpur Line.	158,830	3·24	37·27	
Great Indian Peninsula.	1,381,393	3·39	45·08	This also has earned surplus profits.
Madras - -	545,179	3·07	59·26	This has never paid surplus.
Bombay, Baroda, and Central India.	300,055	4·84	41·97	This has sometimes paid surplus.
Sind, Punjab, and Delhi.	420,869	4·27	55·071	This never.
South Indian -	150,432	2·73	51·45	This not yet.
Eastern Bengal	157,442	4·79	39·42	This has paid surplus profit.
Oudh and Rohilkund.	227,420	3·42	52·38	This not yet.
STATE.				
Calcutta and South Eastern.	9,685	3·73	81·74	None of these have earned any profit to speak of.
Nalhatti -	8,988	4·08	100·48	
Amraoti - } Berar	2,511	9·27	34·2	
Khamgaon } Berar	2,885	6·85	61·9	
Punjab Northern	59,841	4·85	85·92	
Northern Bengal	6,835	3·72	140·29	
Rajputana -	183,494	4·11	68·14	This has earned nearly 4 per cent.
Neemuch -	6,549	3·29	82·62	
Nizam's - -	59,040	4·83	77·5	Not paying lines.
Wardha Valley	5,142	4·66	72·1	
Tirhut - -	20,891	3·40	69·76	
Holkar - -	30,411	4·69	76·72	

4105. As regards the construction of State railways, do the State construct them directly through their own officer, or do they give contracts to other people?—They have followed both plans.

4106. Have you any idea what the comparative result of the two as regards expenses is?—No, I am not in a position to say.

4107. The Rajpootana line was constructed by a contractor, I think?—It was.

4108. And the work was very well done?—Yes, he gave great satisfaction.

4109. Assuming that the Government of India carry out their purpose, which is to apply between three and four millions annually to the construction of railways, do you think that although the capital expenditure upon railroads will be annually increased by that amount, the return

Chairman—continued.

return will each year be better; or to put it in another shape, do you think that the receipts from the railroads which are in operation will so continue to increase as more than to counterbalance the interest of the increased capital which is annually applied to railways?—I quite expect that, because the railways which are being constructed will help very much to bring traffic on those which exist. They will assist each other.

4110. And as the State is to make up the difference between the working expenses and the interest of the money borrowed, on the one hand, and the net receipts on the other, you think that by prosecuting this policy, the annual charge which is imposed upon the State will not be increased?—I am assuming, of course, that the lines are judiciously selected, and economically constructed, and in that case I do.

4111. You have stated at the commencement of your evidence what the total return upon the large railroads in India was; the Government do not get the whole of that money to meet the guaranteed interest and the interest on the sums which they have borrowed directly for the construction of railroads, because a considerable proportion over and above the interest guaranteed goes, does it not, to the shareholders in the shape of surplus profit?—It does.

4112. Could you at all dissect that figure of 6,000,000 *l.*?—The revenue derived from the railways during the past year was 6,117,226 *l.*, and the guaranteed interest due to the companies in respect of that year amounted to 4,662,635 *l.*; leaving a net surplus of 1,454,521 *l.* Out of this, 890,823 *l.* was paid to three companies, the East Indian, the Great Indian Peninsular, and the Eastern Bengal, as the moiety of their surplus profits, which amounted to 1,811,934 *l.* The net amount received by the Government in excess of guaranteed interest was 490,336 *l.*

Mr. *Fawcett.*

4113. That is all that they get for all their expenditure on State railways, and for all that they have lost in previous years in railways?—For many years they have received a proportion of the surplus profits on some of the great lines, besides the repayment of the guarantee.

4114. But until quite recently the net result to the Government, although they received the surplus profits on some lines, was a loss?—Yes, it was.

4115. Then all that they got last year, which, as you say, was an abnormally profitable year to compensate them for the many years during construction in which they received nothing, and the many years during which the railways after being constructed did not pay, and for all that they had expended on State railways, is 400,000 *l.*?—That is all that they received last year.

4116. Have you made any calculation of the great loss that the railways are at the present time according to those figures?—I was going to add that I am afraid that the Government do not even receive the net amount I mentioned as the sum retained by them out of the profits last year. If you take into the calculation the loss by exchange, that sum was absorbed.

Chairman.

4117. But excluding for the moment the question of exchange, the net result to the State last year of all that transaction in railways, was that they have had the advantage of the use of 113,000,000 *l.* of capital in railroads, that they have received the whole indirect benefit of that, and that they have got over and above the interest which was payable on that sum, a net revenue of 490,000 *l.*?—Yes.

4118. Then in previous years there has been a considerable loss to the State?—There has.

4119. And in all the forecasts of the Public Works Expenditure, that loss has been included as part of the charge which is annually imposed upon the State for prosecuting the system of public works?—It has.

4120. And therefore in proportion as the annual loss upon railroads diminishes, so does the total annual charge to the State for public works diminish?—Exactly so.

4121. The great increase in the traffic on the railways has taken place naturally on those lines which now earn or could earn surplus profits, but the State does not get the whole benefit of it?—Not the whole.

4122. Then as regards the amount of interest which has been paid by the State over and above the net receipts, have you any idea what that amounts to; or to put it in another way, supposing we looked upon the Indian railways simply from a financial point of view, and disregarded altogether any future advantages which they conferred upon the State, how would the amount stand now; what would be the capital including the loss of interest?—Up to the end of last year the total amount advanced on account of guaranteed interest was 66,212,183 *l.*; that is the whole which has been advanced on account of guaranteed interest irrespective of receipts. Then they have received from the companies out of the net receipts a sum of 39,409,880 *l.*, leaving the net amount advanced 26,802,303 *l.*

Mr. *Sampson Lloyd.*

4123. That 26,000,000 *l.* represents a loss to the State by guaranteed interest up to the present time, which will be gradually reduced by the surplus profits as years go on?—Just so; but this is exclusive of interest. The 26,000,000 *l.* is repayable to the Government with simple interest.

Chairman.

4124. If we took the return, say 10 years back, of capital expended upon the railways in India, and the net receipt from those railways, we should find that, although the actual amount of capital expended was very much less than it is now, yet, instead of the State receiving a sum more than sufficient to pay the guaranteed interest, it would have had to pay a very considerable sum to make up that guarnteed interest?—Quite so.

4125. Therefore, in proportion as the capital expenditure has increased, so has the return increased proportionately?—Yes, that has been the case.

4126. And you would therefore advocate, within certain limits, the prosecution of a policy of devoting annually a certain sum to the construction of railways?—Certainly.

4127. And you confidently believe that that may be undertaken, not only without any increase of charge to the State, but with an actual diminution

Mr. *Danvers.*

1 August 1878.

Chairman—continued.

diminution?—I think there is very fair ground for hoping that it will.

Mr. *Fawcett.*

4128. What is your duty in the India Office; is it to watch the guaranteed railways?—Yes.

4129. With respect to some of the guaranteed railways there is practically no chance within a reasonable time of their ever paying; for instance, the Sindh, Punjab, and Delhi does not pay one per cent., does it?—Last year it payed 3*l.* 15*s.* per cent.

4130. But there are some that do not pay, are there not?—The lowest last year paid 3*l.* 10*s.* per cent.

4131. But the Sindh, Punjab, and Delhi for some years has paid very little, has it not?—Yes, very little.

4132. Once I think it only paid 12*s.* 6*d.* per cent.?—I do not recollect. The Indus Valley line, which has been just constructed, will very much help the Punjab Railway, I think.

4133. What guarantees do the Government take that the working expenses of those lines which do not pay, are not excessive, because those working expenses in the case of a guaranteed line which does not pay, absolutely come out of the pocket of the Government, or out of the pockets of the people of India, and not a penny is contributed by the company?—That is controlled, as all the acts of the railway companies are controlled, by Government.

4134. Is the control of the Government effective?—I think so.

4135. Do they place, for instance, Government officers along the line?—Not exactly, but Government officers are frequently moving about the line.

4136. With regard to the control which there is now over, we will say, the Sindh, Punjab, and Delhi line, how long is that railway?—The length of the Punjab and Delhi Railway is 553 miles.

4137. That is a railway which hitherto has never paid the guaranteed interest?—It has not yet paid the guaranteed interest for any one year.

4138. How many Government officers are there on the spot to control the expenditure of 553 miles of railway, bearing in mind that every sixpense of the working expenses, or any money that is wasted in extravagance, if there is any paid, is really paid by the people of India, and not a sixpence by the company?—That is quite true.

4139. How many Government officers are there?—The plan is this: at the head quarters of the railway company there is a Government officer, who is called the consulting engineer. He has a staff.

4140. Where are the head quarters?—At Lahore.

4141. One great item of expense in a railway, and especially a railway like the Sindh, Punjab, and Delhi, where coal is enormously expensive, is the coal; who is there on the spot at different places to see that the coal is not wasted, which on that line is usually as much as 2*l.* 5*s.* a ton, is it not?—Hardly so much as that, I think.

4142. But in any case the coal is very expensive?—They are using now Indian coal, which is brought from the Bengal coal fields.

Mr. *Fawcett*—continued.

4143. But then it has to be brought up a thousand miles, has it not?—Quite so.

4144. I have seen it stated that it has been as high as 2*l.*?—I do not question that the expense is a great disadvantage to the line.

4145. For 560 miles of railway, in round numbers, you are virtually allowing the company to spend other people's money, and I want to know what is the exact control which the Government, whose money the company is spending, exercise over this expenditure. You say that they have two officials for 560 miles of railway?—I do not mean to say that they have only two. There is an officer of the Royal Engineers who is appointed to represent the Government at the head-quarters of the railway; he has his staff, and can employ his staff as he chooses; the exact number of that staff I really could not tell you, but it is to be presumed that he considers that he has a sufficient number to exercise that control over the affairs of the railway and their operations which the Government expect.

4146. Are there no records at the India Office to show what sort of control the Government exercise in this very important instance of a company spending other people's money, which they are apparently doing?—I can tell you exactly that the company would not be in a position to make any arrangements for the supply of coal either from England or from Indian sources without the consent of the Government as represented by this officer; he must agree in the propriety of their proposed arrangements.

4147. That, no doubt, can be done from the India Office, but what security is there really to prevent the daily waste, and that extravagance which I think experience shows us is almost certain to occur when people are dealing with other people's money?—You can only do that, I think, by fixing the responsibility on the persons who ought to be responsible and making them accountable. If you found from looking at the returns (and the accounts are very minute) that there has been extravagance, then you would pull them up and call for an explanation.

4148. Of course that is the kind of thing which is done at the India Office?—It is the duty of the railway company, and they also do it in communication with Government officers.

4149. Simply because the India Office is responsible for the finances of India, but I want to know whether any evidence will be produced before this Committee to show that in these railways, where they have no motive whatever to be economical, there is not a more extravagant use of coal than in those railways where they have a motive for being economical; it is one of the first things I should have thought which would have been looked at at the India Office?—It has been and is being continually looked into, and I have no doubt that evidence could be produced to prove that it is so.

4150. Do you know whether there are any records at the India Office which would give the Committee an opportunity of judging whether the control which is exercised by the Government over those railways which do not pay, and which therefore have little motive to be economical, is such, that their expenditure is not larger than on those railways which have a motive to be economical, because the money goes into

Mr. *Fawcett*—continued.

into their own pockets, or a part of it?—I think there would be no difficulty about that.

4151. At the time when 5 per cent. was guaranteed to those companies, the security was precisely the same, was it not, as the security given to any other creditors of the Indian Government; their security has nothing to do with the railways; it is on the general revenues of India, even if the railway did not pay a farthing?—There was a contingency which does not attach to a direct loan. In those days people were very ignorant as to the probable success of Indian railways, and there was a contingency which would have reduced their dividend and have reduced the guarantee. If the railways had been worked at a loss, that loss would have had to be taken out of the guaranteed interest payable to the shareholders.

4152. In the case, for instance, of the present Sindh, Punjab, and Delhi Railway, that has never paid the guarantee, I believe?—No, it has never paid the guaranteed interest in any one year.

4153. During the years when it never paid, and now when it pays only 1 per cent., the shareholders have still received their 5 per cent., have they not?—Yes.

4154. Has there been any instance in which any of the persons who advanced money on guarantee have received less than 5 per cent.?—There was the instance of the Calcutta and South Eastern Railway, who took advantage of a condition in the contract which enabled them to surrender the line, if it was working at a loss.

4155. This bargain was made by the Government on behalf of the people of India; they guarantee more than the current rate of interest, and they give the people to whom this large guarantee is given this additional advantage, that if the railway does not pay its working expenses, they can at any moment throw it on the hands of the Government, and make the Government buy it at par?—That is so.

4156. Can you give any reason for such an extraordinary bargain as that?—The reason is, that it was considered necessary.

4157. Why; if the Government could freely borrow money at 4½ per cent. or 4 per cent. during the whole of this time, as they could the greater part of the time, why should they have thought it necessary to lend it at 5 per cent.?—I mean that having decided that the agency of companies should be employed for the construction of railways, it became necessary then to guarantee such a rate of interest as would enable the companies to raise the money.

4158. When the current rate of interest during the greater part of the time that the guarantee of 5 per cent. was given was 4 and 4½ per cent., why was a guarantee of 5 per cent. given to the English companies; almost all those companies are English, are they not?—They are all.

4159. Why was the guarantee given; the security was not only good, but it was precisely the same with this condition of being able to throw up the line at par?—I think you will find that there was not the same difference then that there is now between the terms on which money could be raised by Government and companies with a guarantee.

4160. The greater portion of the time when these guarantees of 5 per cent. were being given,

Mr. *Fawcett*—continued.

4½ per cent. stock was above par, was it not?—Probably that was so.

Chairman.

4161. Are you sure of that?—I am almost sure, but I would rather not say positively.

4162. Your impression is that this guarantee was a little higher than the rate of interest?—Yes. Sometimes it has been lower, but those were exceptional times. I recollect during the Mutiny once the East Indian Railway Company raised a large sum of money, a million I think, at 5 per cent., whereas the Government had failed to issue their 5 per cent. stock.

Mr. *Fawcett.*

4163. You have laid some valuable figures before the Committee as to the net returns from railways; of course the net returns are the gross returns, deducting the working expenses; in arriving at that result, how much is allowed for the establishment charges?—I am afraid I cannot answer that off-hand, but it is a small proportion.

4164. In arriving at this net return, there is simply the working expenses on the railway and the payment of the officials who are employed directly on the railway to consider; or is a certain proper share of the general expenditure of the Public Works Department establishment charges thrown in?—Everything is included in the working expenses which is necessary to maintain and keep the railway in repair as well as to work it.

4165. Are the salaries of the Government officials who watch the railway included?—No, they are not.

4166. Are the pensions of the servants connected with the Public Works Department included?—No.

4167. For instance, are any salaries connected with the pay at the India Office included?—No.

4168. All those expenses which may be regarded as arising out of the fact that the Government has undertaken to carry out those railways are not included?—None of the salaries of the officers of the Government are included in the working expenses of the guaranteed railways.

4169. And none of the general establishment charges are included?—No, not of the Government.

4170. Has any calculation ever been made of them?—Very likely, but I have not got it before me now.

4171. Do you think you could furnish it to the Committee?—Certainly.

4172. Going back to those figures which you have given us of last year, they were abnormal receipts, you say?—It was an exceptional year.

4173. Have you made any calculation of what those abnormal receipts were, were they a million?—Hardly so; I should think about 600,000*l.*

4174. Excepting that, what we arrive at is this, a return of 5,700,000*l.* on a capital of 113,000,000*l.*?—While so much was exceptional, as I have mentioned, it is only fair to state that a good deal of traffic was lost in consequence of the necessity for using the rolling stock of the railways almost exclusively for the famine.

4175. I know that, but what I mean is the

Mr. *Danvers.*

1 August 1878.

Mr. *Danvers.*

1 August 1878.

Mr. *Fawcett*—continued

net exceptional receipts. I want to know what you would consider we may take as a fair average return upon which to base our calculations?—It is almost impossible to estimate, for the future, when the traffic depends upon so many things which one cannot foresee.

4176. Taking your figures of last year, which you admit was an exceptionally favourable year, we arrive at the result that you had 6,300,000 *l.* net receipts on an expenditure of 113,000,000 *l.*?—Yes.

4177. That 113,000,000 *l.* does not include the 26,000,000 *l.*, as I understand you, which has been paid out of the revenues of India for interest, for which there is no return?—Those figures have nothing whatever to do with the guaranteed interest.

4178. But then the real cost to the country is not 113,000,000 *l.*, but is 113,000,000 *l.* plus 26,000,000 *l.*?—That 113,000,000 *l.* is simply the capital.

4179. If you enter into a certain bargain with companies to construct the railways which they have in India, you must reckon in the cost of the railways as the amount of interest which the Government have had to pay to the companies during the time of construction?—That may be added if you wish.

4180. But it would be necessary to include that, in order to arrive at the real financial result?—£. 26,000,000 *l.* is undoubtedly the sum which has been paid out of the revenues of India, which has not been repaid yet, but which will be repaid in future years out of half the surplus profits of the undertakings.

4181. But still at the present time it has not been repaid to the Government of India?—No, it has not.

4182. According to your figures you make out, do you not, that on paper there was 490,000 *l.* net to be paid to the Government of India, on an expenditure of 113,000,000 *l.* direct, and on an expenditure of 26,000,000 *l.* which you say may be returned?—That 490,000 *l.* was in excess of the guaranteed interest which was paid.

4183. That 490,000 *l.* is simply a figure on paper, because the arrangement is this, that you have to pay the guaranteed interest in gold, and you receive your receipts in silver, which at the present time is depreciated, and therefore the Government is constantly losing. What was their loss last year by the exchange, upon the whole?—I have not calculated that; I should say about 7 per cent. on the amount that they paid in this country on behalf of the railways.

4184. How much did they pay?—I have not got the figures at hand.

4185. Can you give it to us approximately?—There are two or three different kinds of payments which the Government make: first, there is the advance in this country of the money required for expenditure in India for stores, for maintenance and repairs; I should say the loss upon that last year was something like 150,000 *l.*

Chairman.

4186. What is the rate at which the rupee in the contract is estimated?—One shilling and tenpence.

4187. Therefore the loss in exchange would be the difference between the current rate and 1 *s.* 10 *d.*?—Just so.

Mr. *Fawcett.*

4188. What do you think would be the loss by exchange on the guaranteed interest?—Speaking of last year, I should say about 320,000 *l.*

4189. Then the loss in exchange pretty well absorbs the whole of the net produce which was left after payment of interest, and therefore the aggregate result is that there is nothing left to the Government of India for the money which it has spent on State railways, and for the 26,000,000 *l.* which represents the accumulation of interest?—No, from that point of view there was nothing.

4190. That is the only point of view at the present time, looking at it financially. I am not now at all considering the indirect benefits, but simply looking at the financial results; that is the only correct way to look at it at the present moment, is it not?—I cannot say that it is an incorrect way, but it is mixing up two matters, I think.

4191. What two matters do you mean?—I mean it is not keeping the railway accounts distinct from others, so as to show the results of the working of the lines; but it is a fair view to take.

4192. I do not include anything but direct railway accounts, because it seems to me that the unfortunate bargain which the Government of India has made, and which I do not see how they can escape, is, that they borrow the money and they expend it, and they receive their revenue in silver, and they have to pay their interest in gold?—Yes.

4193. That is the condition of the financial arrangements which have been made, and which seems to me inseparably connected with the working of the railways?—Yes.

4194. Do you think that the railway prospects in future look hopeful in India?—I do.

4195. Do you think that money judiciously expended there will return a good outlay?—I think there is a very fair ground for hoping that it will.

4196. Can you explain how it is that India seems to be the only country in the world which is at all under our control in which English capitalists seem steadily to refuse to invest money in such commercial undertakings as railways?—If it is the case, I cannot explain it.

4197. Have you ever considered that it is hopeless for them to expect that they will do so, so long as they think that there is a chance of getting a guarantee?—That may influence them.

4198. Have any efforts been made lately to induce private capitalists to invest money; are there any proposals now before the Government?—Frequent attempts have been made by the offer of every kind of facility, the grant of land, and so on.

4199. Is there not a proposal now before the Government for a private company?—There is.

4200. Schemes for constructing railways, I suppose, are constantly brought under your notice at the India Office?—Yes.

4201. Has the Carwar Railway been lately brought under your notice again?—A line which would be a rival of the Carwar Railway, commencing from Goa (which is in Portuguese territory), and going to Bellary, has been under consideration.

4202. Has

Mr. *Fawcett*—continued.

4202. Has the idea of the State constructing that railway been abandoned?—The position in which that enterprise is now, is that a concession has been granted to an individual, a gentleman of the name of Campbell, who has undertaken to form a company for the purpose of making the line from the port of Marmagoa to Bellary without a guarantee, the Government undertaking to give them land and other facilities.

4203. Then the real fact is, that the Government have decided not to carry it out, but that a company may do it if they like?—Yes; this company has the opportunity of doing so.

4204. There is a contemplated expenditure, is there not, of 4,000,000 *l.* a year on railways?—It has been proposed that an expenditure something under that should be laid out on railways.

Chairman.

4205. Three million pounds was the sum, was it not, in the last forecast of public works?—Yes.

Mr. *Fawcett.*

4206. What security is there that in the case of guaranteed companies, the revenue will not be spent in dividends, when the companies begin to pay, which ought to be devoted to keeping the line in a proper state of repair?—The Government have full control over that matter, inasmuch as every sixpence earned by the companies is at once paid into the Government Treasury, so that they have command of the money.

4207. What rules do you adopt; supposing, for instance, the East Indian Railway Company wants to raise fresh capital, you have to give a guarantee, have you not?—If it is in addition to their guaranteed capital, it would have to be guaranteed.

4208. What are the steps which are taken; suppose they propose to raise fresh capital, what control is exercised on the purposes to which that capital is to be devoted?—In the first instance the object would have to be carefully examined and concurred in by the Government.

4209. Are there any rules laid down as to what purpose should be considered proper for the expenditure of fresh capital, and what object should be paid for out of revenue?—I am not aware of any rules. Of course each case has to be decided as it occurs under the special circumstances appertaining to it.

4210. What principle is adopted; do you take the same principles that regulate the management of a private undertaking?—Yes.

4211. Those questions are constantly brought under your notice, are they not?—Yes.

4212. Have any inquiries been made which would show me that the principles which regulate the expenditure of money on those guaranteed railways, as to whether it should be spent out of capital or out of revenue, are the same as those which regulate the management of private railway companies generally?—That question of capital and revenue expenditure is one which is continually occurring; that is to say, whether a certain charge should be made against capital or against revenue. There are endless discussions and disputes upon that in the smallest matters very often; I thought at first you alluded to the raising of fresh capital for the purpose of extending or increasing the carrying power of the

Mr. *Fawcett*—continued.

railway; in that case, whether it is doubling the line or whether it is an addition to the locomotive stock, the matter is most carefully examined and gone into, both by the Government and the railway officers, and no decision is come to until it is perfectly clear that it is necessary.

4213. Do you think that sufficient care is taken in that respect?—I believe so.

Mr. *Onslow.*

4214. As to this Carwar line which you were talking about just now, what is its length?—About 220 miles; it commences at Marmagoa, and is to join the Madras Railway at Bellary *viâ* Dharwar.

4215. The Government have already sanctioned the plan through Mr. Campbell, for the construction of the line, have they not?—Certain concessions have been made to Mr. Campbell, including the free grant of land, and the permission to obtain stone, limestone, and earth from any waste land at the disposal of the Government; and a formal contract embodying these and other terms of an agreement will be entered into with Mr. Campbell, on the Secretary of State being satisfied at any time within 12 months from April last, that a joint stock company has been formed to carry out the scheme, and that sufficient capital for the purpose is forthcoming.

4216. What has been done about the sufficient capital?—I do not know. That matter is in Mr. Campbell's hands.

4217. But what I understand that the Government have done about it is, that they have sanctioned it only on condition that a certain amount of capital is subscribed to pay so much per mile for the construction of the railway?—Estimates have been made, and the Government require that proof should be given that this company is able to raise the capital before the line is commenced.

4218. And that the capital will be sufficient for the line?—Yes.

4219. Because unless everything is laid down very carefully, the Government of India will find themselves in a position with that line the same as they are with some of the irrigation companies?—Yes, quite so. The object of this arrangement is, that that should not happen, that the Government shall be quite satisfied that the money will be forthcoming.

4220. You are perfectly satisfied, so far as the Dharwar line goes, that what has been done is sufficient to meet all the requirements of the case?—Nothing has been done beyond what I have stated with regard to the Goa line. The company has a year from April last within which they may prove to the Government that they can raise the money. It is another attempt to enable a company to make a line without a guarantee.

4221. You quite see the importance, after the experience which we have had of India, of everything being properly and definitely laid down before even a sod is turned?—That is very important, and the Government have that clearly in view.

Mr. *Sampson Lloyd.*

4222. I think you said, in answer to the honourable member for Hackney, that India was the only country where Englishmen would not

Mr. *Danvers.*

1 August 1878.

Mr. *Sampson Lloyd*—continued.

invest in railways without a guarantee?—I said that I did not know why this should be the case, if it were the fact.

4223. Can you mention any other country at all like India, that is, any eastern country, or any country not imbued with western civilisation, where Englishmen have invested, in any case, money without a guarantee in railways?—I do not know whether in Japan the Government have given a guarantee.

4224. Is it not a fact that in the case of most railways in countries not European, in which Englishmen have invested money, there has been a guarantee, such as the Bahia and San Francisco Railway, and various South American places?—Yes, certainly, and in Russia too.

4225. Therefore, I gather that there is really nothing peculiar in a guarantee being given to Englishmen as a temptation to them to invest money in an eastern country or a country which is not European?—Not at all.

4226. Therefore, the only question, I presume, which remains, is whether 5 per cent. is more than was sufficient to attract capital; but, in your opinion, it was necessary that some guarantee should have been given, and that if it had not been given, the railways would probably not have been made?—Quite so.

Sir *Joseph M'Kenna.*

4227. The stock of a line of railway which offers a prospect of paying a dividend, irrespective of its guarantee, can be floated at a lower

Sir *Joseph M'Kenna*—continued.

guaranteed rate than a line which derives its prospects most exclusively from the guarantee; is not it a fact that a guaranteed stock of an Indian line of railway, well circumstanced, can be more easily floated than the guaranteed stock of a line which solely depends for its prospect of remuneration to the shareholder on the guarantee. That is to say, a company with a line having a fair prospect of a surplus dividend beyond the guarantee would be more likely to raise money upon easier terms than another?—I think so.

4228. It follows from that, as it strikes me (and I want to have your evidence upon the matter), that it is no evidence that 5 per cent. is an improper guarantee to give on one line because a 4½ per cent. guaranteed stock of another may happen to be above par?—No; but it depends chiefly on the state of the money market. A great deal of money lately has been raised at a much lower rate than 5 per cent.

4229. It has been raised when that class of undeataking has been proved to the public to be in its nature remunerative?—That would no doubt assist.

4230. You are aware that in Ireland, within the last year or two, railways have been floated upon county guarantees?—Yes.

4231. And those county guarantees are to the extent of 5 per cent.?—Yes.

4232. And therefore a guarantee of 5 per cent. in an eastern dependency does not appear exorbitant?—No.

APPENDIX.

LIST OF APPENDIX.

Appendix, No. 1.

Paper put in by Lord George Hamilton: PAGE.

Note on the Measures to be adopted for the Extension of Irrigation Works in India, by aid of Special Loans to be raised for the Purpose. By Colonel R. Strachey, R.E., Secretary to Government of India, Public Works Department - - - - 333

Appendix, No. 2.

Paper put in by Lord George Hamilton:

Minute by His Excellency Sir John Lawrence, Governor General, dated 9 January 1869 - - - - - - - - - - - - - - - 351

Railway Extension in India - - - - - - - - - - - 351

Appendix, No. 3.

Papers put in by Lord George Hamilton:

Forecast of Expenditure from Loan Funds on Railways and Irrigation Works - - 362

Memorandum, No. I.—On the Forecasts of Guaranteed and Loan Works Expenditure and Income, from 1872–73 to 1877–78, including Railways and Irrigation Works - 363

Memorandum, No. II.—On the Forecast of Irrigation Charges - - - - - - 366

Irrigation Works.—Rough Forecast of Money likely to be required from Loan Funds during Six Years - - - - - - - - - - - - - - 368

Memorandum, No. III.—On the Forecast of Railway Charges - - - - - - 370

Explanation of Estimates of New Traffic Receipts of Guaranteed Railways for 1872–73 and 1873–74 - - - - - - - - - - - - - - 371

Statement, No. I.—Guaranteed Railways.—Approximate Statement of Past Expenditure and Probable Future Capital Outlay (both in England and India) during Six Years ending 31 March 1878 - - - - - - - - - - - 373

Statement, No. II.—State Railways.—Approximate Statement of Past Expenditure and Probable Future Capital Outlay (both in England and India) during Six Years ending 31 March 1878 - - - - - - - - - - - - 374

Statement, No. III.—Approximate Statement of the Total Net Charge on the Revenues of India on account of Guaranteed Railways, for the Six Years ending 31 March 1878 - - - - - - - - - - - - - - 376

Statement, No. IV.—Approximate Statement of the Total Net Charge on the Revenues of India on Account of State Railways, for the Six Years ending 31 March 1878 - - - - - - - - - - - - - - 376

Statement, No. V.—Summary.—Approximate Statement of the Total Net Charge on the Revenues of India on account of all Railways, for the Six Years ending 31 March 1878 - - - - - - - - - - - - - - 377

Forecast of Expenditure from Extraordinary Funds on Railways and Irrigation Works 385

Public Works Extraordinary and Guaranteed Railway Forecasts, 1875–76 - - 389

General Summary.—Forecast of Net Charge on the Revenues of India on account of Guaranteed Railways, and State Railways, and Irrigation Works, classed as Public Works Extraordinary - - - - - - - - - - - 389

Guaranteed Railways.—Statement, No. I.—Estimated Capital and Interest Payments of Guaranteed Railways to End of 1879–80 - - - - - - - 390

Guaranteed Railways.—Statement, No. II.—Statement of Actual and Estimated Net Traffic Receipts of Guaranteed Railways, as applied, or to be applied, in the Reduction of Charges for Guaranteed Interest - - - - - - - 391

Guaranteed Railways.—Statement, No. III.—Approximate Statement of the Total Net Charge on the Revenues of India on account of Guaranteed Railways to End of 1879–80 - - - - - - - - - - - - 392

Appendix, No. 3—*continued.*

Papers put in by Lord George Hamilton—*continued.* PAGE.

State Railways.—No. I.—Statement of Actual and Proposed Outlay, to End of 1879-80, on State Railways in India - - - - - - - - - - 393

State Railways.—No. II.—Statement of Actual and Estimated Net Traffic Receipts of State Railways from 1871-72 to end of 1879-80 - - - - 394

State Railways.—No. III.—Approximate Statement of the Total Net Charge on the Revenues of India on account of State Railways for the Period ending 1879-80 395

Irrigation Works.—No. I.—Statement of Actual and Proposed Outlay, to End of 1879-80, on Irrigation Works in India - - - - - - - - - 396

Irrigation Works.—No. II.—Detailed Statement of the Actual and Estimated Net Direct Revenue of Irrigation Works in Bengal and Northern India for the Eleven Years ending in 1879-80 - - - - - - - - - - 400

Irrigation Works.—No. III.—Detailed Statement of the Actual and Estimated Net Total Income derived from Irrigation Works in Bengal and Northern India for the Eleven Years ending in 1879-80, including the enhancement of Land Revenue due to the Works - - - - - - - - - - - 401

Irrigation Works.—No. IV.—Actual and Approximate Statement of the Total Net Charge, to End of 1879-80, on the Revenues of India on account of Irrigation Works - - - - - - - - - - - - - - - 402

Memorandum on the Revised Forecast of Charges and Receipts from Guaranteed Railways, and State Railways, and Irrigation Works - - - - - - - 402

Despatch to the Most Honourable the Marquis of Salisbury, Secretary of State for India, dated 3 February 1876 - - - - - - - - - - - - - 410

Table, No. I.—Table of Capital Outlay, Actual and Proposed, on Railways and Irrigation Works already in Progress, and Chargeable to the Head Extraordinary 414

Table, No. II.—Table of Capital Outlay proposed on Projects now recommended to be set in hand, and charged to the Head Extraordinary - - - - 415

Appendix, No. 4.

Paper handed in by General Dickens:

East India Finance and Revenue Accounts - - - - - - - - - 415

General Account of the Revenue and Expenditure and Receipts and Disbursements of the Government of India, in India and in England, for the Year ended 31 March 1876 - - - - - - - - - - - - - - 416

No. 1.—Account of the Revenue of India, showing the Amount received on each Account in the several Provinces of British India, and in England, for the Year ended 31 March 1876 - - - - - - - - - - - - - 418

No. 2.—Account of the Ordinary Expenditure chargeable on the Revenues of India for the Year ended 31 March 1876 - - - - - - - - 420

Statement showing the Estimated Cost of Construction of Productive Irrigation Works, the Capital Outlay thereon, the Revenue derived therefrom, the Working Expenses, the Interest on the Expenditure incurred in respect of those Works, and the Financial Result - - - - - - - - - - - - - 422

Statement showing the Revenue and Charges in respect of Indian Guaranteed Railways and the Madras Irrigation and Canal Company during the Year ended 31 March 1876 - - - - - - - - - - - - - - 426

Statement showing the Capital Outlay on State Railways, the Revenue derived therefrom, the Working Expenses, the Interest on the Expenditnre incurred in respect of those Works, and the Financial Result - - - - - - - 427

(A.)—Account showing the Amount of Debt transferred to or incurred for Productive Public Works, and the Amount applied to the Construction of those Works, during the Year ended 31 March 1876, and the Balance - - - - - - 428

Account of the Public Debt of India, and the Interest paid thereon, for the Year ended 31 March 1876 - - - - - - - - - - - - 429

Appendix, No. 5.

Paper handed in by Lord Northbrook, 5 April 1878:

Extract from a Speech made by Lord Northbrook in the Legislative Council of India, 5 August 1875 - - - - - - - - - - - - - - - 430

Statement showing the Revenue and ordinary Expenditure of the Government of India, in India and England, for the Four Years from 1871-72 to 1874-75, the Expenditure for Famine Relief in the Years 1873-74 and 1874-75, and the Surplus upon the whole ordinary Account - - - - - - - - 434

Appendix, No. 5—*continued.*

Paper handed in by Lord Northbrook, 5 April 1878—*continued.* PAGE.

Abstract of the Receipts and Disbursements of the Government of India, in India and England, from 1871–72 to 1874–75 - - - - - - - - - 434

Statement showing the Expenditure of Guaranteed Railway Capital and upon Public Works Extraordinary in each Year from 1861–62 - - - - - 435

Appendix, No. 6.

Papers handed in by Lord Northbrook:

Review of the Progress of Irrigation Schemes in relation to Famine Aspects, by Colonel F. H. Rundall, R.E., Inspector General of Irrigation Works - - - - - - 436

Fort William, 27 November 1874.—Review of the Wants and Prospects of India in regard to Irrigation Works - - - - - - - - - - - - - 450

Appendix, No. 7.

Paper put in by Colonel Crofton, R.E.:

The Sirhind Canal - - - - - - - - - - - - - - 453

Appendix, No. 8.

Paper put in by Sir George Campbell, M.P., 16 May 1878:

Famines which affected Bengal in the last Century - - - - - - - - 455

Appendix, No. 9.

Papers handed in by Colonel Fife, and referred to in his Evidence, Q. 2126:

Memorandum, dated 29 May 1874 - - - - - - - - - - - - 467

Memorandum, dated 22 June 1874 - - - - - - - - - - - - 467

Annual Reports - - - - - - - - - - - - - - 470

Resolution - - - - - - - - - - - - - - - 470

Land Revenue - - - - - - - - - - - - - - - 471

Resolution of Government, dated 10 March 1875 - - - - - - - 476

Appendix, No. 10.

Paper handed in by Sir W. Muir, and referred to in his Evidence of 4th July:

Extract from Report on the Famine of 1860–61, in the North West Provinces of India, by Colonel R. Baird Smith, dated 14 August 1861 - - - - - - - 481

Appendix, No. 11.

Paper handed in by Sir W. Muir:

I.—Bhabur Canals, North West Provinces - - - - - - - - - 490

II.—Burmdeo Canal - - - - - - - - - - - - - 492

Burmdeo Canal Account, showing Total Expenditure from 1872 to May 1875 - 495

Appendix, No. 12.

Paper handed in by the Chairman:

Letter from Colonel Fife to the Chairman of the Committee, dated 25 June 1878 - 496

Memorandum, dated 1 September 1877 - - - - - - - - - - 499

Bombay Presidency—Irrigation Department.—Comparative Statement of Dimensions and Cost of Storage Works Constructed, under Construction, or proposed, in the Deccan - - - - - - - - - - - - - - 500

Appendix, No. 13.

Memorandum handed in by Mr. Alexander Meadows Rendel, C.E. - - - - - 502

APPENDIX.

Appendix, No. 1.

PAPER put in by Lord *George Hamilton*.

NOTE on the Measures to be adopted for the Extension of Irrigation Works in India, by aid of Special Loans to be raised for the Purpose. By Colonel *R. Strachey*, R.E., Secretary to Government of India, Public Works Department. Appendix, No. 1.

THE Secretary of State, in his Despatch, No. 39, of the 8th August last, has informed the Government of India that he concurs in the conclusion "that the State should undertake directly all the irrigation works that it can practically manage, in preference to entrusting them to private companies, and that when the surplus revenues and available balances prove insufficient to supply the requirements of the country, funds by means of loans should be raised." He adds that he will be prepared to give favourable attention to the practical steps the Government of India may propose to adopt for giving effect to these conclusions.

2. In the letter to the Secretary of State, the substance of the reply to which is above given, the Government of India had said, that "the immense value of irrigation to the agricultural community in all parts of India is beyond dispute; and we are sensible of the serious responsibility which rests on the Government to do what is in its power to extend works designed for this purpose. Much has already been accomplished, but more still remains to be done, and it should without doubt be our constant aim to follow up with yet greater consistency and practical force the efforts that have for many years past been made to extend the benefits of irrigation to the country at large." It was also said, that "the history of the last famine in Upper India is still fresh enough in the memories of every one to render superfluous any general comments on the appalling character of a season of drought over a large area. In like manner we believe that the luminous Report of the late Colonel Baird Smith sufficiently demonstrates, without any further remarks on our part, the real power of systematic irrigation to amend the worst consequences of such a season of drought, and proves that against such visitations there is in truth no other security possible; all other things, and among them improved communications, acting only as feeble palliatives. It will be a day of the greatest promise for the future well-being of India when the Government shall take the first decisive step towards the gradual but systematic introduction of Irrigation Works into every district now liable to occasional seasons of drought, and shall thereby lay the foundation of a new order of things, under which the sound and material progress of the community will no longer be liable to be suddenly arrested and thrown back indefinitely, as is now the case, and as must ever continue to be the case, so long as the country is left without the safeguard of a sufficient supply of artificial irrigation to support the people and the cattle in a season of drought."

3. In submitting the Despatch of the Secretary of State above referred to, for the orders of the Government, it becomes my duty to offer such suggestions on the subject as have occurred to me after a careful consideration of the whole question, which, as the Secretary of State observes, may justly be regarded as one of the most important that can arise in the administration of Indian affairs. I have been most strongly impressed with the serious responsibility that now rests on the Government of India in giving a proper direction to the future action of the State in regard to Irrigation Works; and the delay that has arisen in taken up the questions which have to be discussed in connection with the Secretary of State's Despatch will, I feel assured, be excused when the extremely great importance of arriving at a sound practical conclusion is considered. I may be permitted to add that few things would be so gratifying to myself as the knowledge that the foundation of a persistent policy, having for its object the systematic extension of irrigation over every part of India, had been laid before my connection with the Public Works Administration ceased.

4. It will be apparent to every one who has followed the discussions which have ended in the Secretary of State's Despatch now under consideration, that the general problem to be solved involves primarily the financial question, How shall the necessary funds be provided? If no financial difficulties had stood in the way there can be no doubt that long ago the Government would have undertaken Irrigation Works to a vastly greater extent than in fact has been possible. But till now the propriety of obtaining the requisite funds by loan, after the surplus available from income or the balances has been exhausted, has never been distinctly admitted, and as a consequence the progress of Irrigation Works

Appendix No. 1.

has been practically limited by the annual grants for public works, which have been provided from the ordinary ways and means of the country. For some years past, since the finances have been administered on an improved system, it has been the declared policy of the Government to limit the public works grants to the sums that can be allowed from the ordinary revenue after discharging all other claims of all sorts. Formerly the wants of the Government for public works were dealt with in the same general manner as the wants for other objects, and to a certain extent the open loans served to supply the outlay on public works, as well as on other services. There was, however, no recognised principle that Irrigation Works, or any other class of works, might properly be provided for from funds raised by loan, and the so-called Pudlic Works Loan was in fact a general loan, intended to make good the general deficit that arose at that time, though the deficit was no doubt partly due to the Public Works charges.

5. The decision of the Secretary of State, lately received, places the supply of funds for Irrigation Works on a new basis, and for the first time the Government has recognised that the sum available from the ordinary revenues for such works may probably be supplemented by funds to be specially raised on loan.

6. The first point to consider, then, will be, What is the sum that may probably be available year by year from the ordinary revenue for this class of works.

7. A reference to the recent orders of the Government of India on the probable outlay on barracks will show that it has been provisionally decided that a sum of 2,000,000 *l.* may by regarded as the annual amount to be provided for works of public improvement for the present. The grant for the current year has been considerably more than this, but under all the circumstances of the case the sum above named has been considered a suitable grant for the coming, and for future years.

8. The following figures give the actual grants, made for the last four years, under the head of Agricultural Works, which term is perfectly synonymous with Irrigation Works, excepting in Bengal, where it refers exclusively to embankments:—

TOTAL GRANTS.

YEAR.	New Works.	Repairs.	TOTAL.
	Rs.	*Rs.*	*Rs.*
1861-62 - - - - - - -	23,00,312	22,50,313	—
1862-63 - - - - - - -	22,72,046	23,56,723	—
1863-64 - - - - - - -	22,38,067	21,26,513	—
1864-65 - - - - - - -	27,35,230	23,25,440	—
TOTAL - - -	95,45,655	90,58,989	—
Average - - -	23,86,414	22,64,747	46,51,161

For the five larger Governments the following are the grants; the other provinces are omitted, the expenditure in them being very small:—

ORIGINAL WORKS.

YEAR.	Madras.	Bombay.	Bengal.	North Western Provinces.	Punjab.	TOTAL.
	Rs.	*Rs.*	*Rs.*	*Rs.*	*Rs.*	*Rs.*
1861-62 - - -	3,38,481	2,23,882	1,01,845	8,91,039	7,40,533	22,95,780
1862-63 - - -	6,75,995	1,56,359	2,14,943	7,70,399	4,53,250	22,70,946
1863-64 - - -	4,82,865	2,23,198	2,01,800	7,45,401	5,52,403	22,05,667
1864-65 - - -	7,11,900	4,84,310	4,15,680	5,32,120	5,54,310	26,98,320
TOTAL - - -	22,09,241	10,87,749	9,34,268	29,38,959	23,00,496	94,70,713
Average, 4 Years -	5,52,310	2,71,937	2,33,567	7,34,740	5,75,124	23,67,678

Appendix, No. 1.

REPAIRS.

YEAR.	Madras.	Bombay.	Bengal.	North Western Provinces.	Punjab.	TOTAL.
	Rs.	*Rs.*	*Rs.*	*Rs.*	*Rs.*	*Rs.*
1861–62 - - -	10,00,000	4,20,960	2,09,500	3,42,500	2,68,638	22,41,598
1862–63 - - -	10,10,579	4,19,279	2,01,000	3,02,839	4,15,946	23,49,643
1863–64 - - -	9,47,247	2,68,110	2,20,000	4,17,178	2,65,138	21,17,673
1864–65 - - -	10,85,280	4,03,850	2,37,500	3,74,250	2,12,960	23,13,840
TOTAL - - -	40,43,106	15,12,199	8,68,000	14,36,767	11,62,682	90,22,754
Average, 4 Years -	10,10,776	3,78,050	2,17,000	3,59,192	2,90,671	22,55,689

9. It may hence be inferred that the present charge for maintenance under this head, which is an obligatory charge, is not less than 23 lakhs, and having regard to the gradual extension of works, it will not be safe to estimate the charge, for some few years to come, at less than 25 lakhs annually.

10. Also, it may fairly be reckoned that from such grants for public works as have been made for the last four years, a sum of about 25 to 30 lakhs may be given to Irrigation Works without inconvenience or undue restriction of other classes of works.

11. From an examination of the actual grants of the last four years under the other sub-heads of Works of Public Improvements, viz., Communications and Miscellaneous, it appears probable that the charges for maintenance under these heads may be reckoned as not likely to vary much from 40 lakhs annually. Taking account of the steady increase of charge for road repairs, 45 lakhs will be a safer sum to take for the future. The grants for new works under the head Miscellaneous (which are mainly lighthouses and harbours), may be taken at 5 to 10 lakhs. The residue of the grant goes to new roads and works of inland navigation.

12. On the whole, a total grant on the standard of 200 lakhs, or 2,000,000 *l.*, might be expected to be thus distributed:—

	Lakhs.	*Lakhs.*
New Works.		
Agricultural - - - - - -	30	
Communications - - - - - -	93	
Miscellaneous - - - - - -	7	
TOTAL - - -		130
Repairs.		
Agricultural - - - - - -	25	
Communications and Miscellaneous - -	45	
TOTAL - - -		70
GRAND TOTAL - - -		200

13. The above figures show a probable distribution based on the experience of the last four years. It would, of course, be possible in an arbitrary way to require a larger appropriation to Irrigation Works, making a corresponding reduction from communications. But it may be doubted, having regard to the absolute wants of the country for the completion of roads, whether the appropriations for such works could properly be much reduced for some years to come; and it will, I think, be taking a very high estimate of the sum available for Irrigation Works to place it at 50 lakhs or 500,000 *l.* annually.

14. An annual grant of 500,000 *l.* for this class of works would be approximately double the average of the last four years. Let us now see what sums it would admit for expenditure in the larger provinces. The amounts, at double the rate of the actual averages, would be as follows:—

	Lakhs.
Madras - - - - - - - - - -	12
Bombay - - - - - - - - - -	6
Bengal - - - - - - - - - -	5
N. W. Provinces - - - - - - - - -	15
Punjab - - - - - - - - - -	12
TOTAL - - -	50

15. The

Appendix, No. 1.

15. The utter inadequacy of such grants to carry out with proper activity Works of Irrigation on any but the smallest scale will at once be apparent. The Ganges Canal, before it was opened, had cost about two millions. If the whole grant to the North Western Provinces at the above rate were appropriated to such a work, it would require 12 or 13 years to complete it. With such grants as have actually been made during the last four years, the necessary time would be double this, say 25 years. Nearly the same remarks would apply to the Baree Doab Canal. The cost of this may be put down at about 1½ millions, so that the entire Punjab grant at the higher rate would be required for 12 years, and the actual average grant for over 25 years to complete the works. In point of fact both the Ganges Canal and the Baree Doab Canal have been executed with borrowed capital. Their construction took place during the period when there was a loan constantly open, and without this resource they could never have been carried on. Since the extraordinary grants made for these works have ceased, the progress of Irrigation Works in Upper India has virtually ceased also. It may be added, that it will practically be quite impossible to find the money required for the remodelling of the Ganges Canal, from the ordinary annual grants to the North Western Provinces. If the amount be taken from the ordinary income, it will be equivalent to reducing the general grant for works of public improvement by, say, 15 or 20 lakhs for the next three or four years; and this will be not very different from stopping progress generally.

16. Without further argument, then, it seems to be quite apparent that for the proper prosecution by the State of works on such a scale as above named, the sum available from the ordinary annual grants would be quite insufficient, and that it would be unjustifiable to allow works of this class of magnitude to be put in hand if no other resources were forthcoming. Like considerations apply in a somewhat modified form, but with equal force, to the vigorous prosecution of the Irrigation Works in the Madras Deltas, where on the best authority it is stated that not one-half of the land has yet been brought under irrigation. The only completion of the canals that have long been in progress in Sindh, and the commencement of other similar works there and in other parts of the Bombay Presidency on a scale commensurate with the acknowledged urgency of the demand, must equally depend on the provision of funds in addition to the ordinary annual grants; and the development or extension of artificial irrigation in most of the provinces of India, in such a systematic manner as will fully guard the country from serious disaster by reason of drought, stands on the same footing.

17. It is of course extremely difficult to form any trustworthy estimate of the probable sum that could usefully be spent on Irrigation Works within a limited period, having in view their systematic extension all over India; but it will facilitate the apprehension of the subject if a rough computation of the amount is made so far as it is possible.

18. The following, then, may be stated as a possible list of requirements:—

Punjab:	£.
Completion of Baree Doab Canal	500,000
Sutlej Canal	2,000,000
Improvement of Western Jumna Canal.	250,000
Supply of Jumna and Cuggur water to Bhuttee territory.	250,000
Inundation Canals from Sutlej	250,000
Chenab Canal	2,000,000
Canals, &c., in Sindh Sagur Doab and Trans-Indus.	1,000,000
TOTAL £.	6,250,000

North Western Provinces and Oudh:	
Completion of Ganges Canal	750,000
Canals in Rohilkhund	500,000
Dam on Jumna below Delhi, and Canals from it.	750,000
Canals from Sarda and Gogra	4,000,000
Works in Bundelkhund	500,000
Canals from Tonse	250,000
TOTAL £.	6,750,000

Bengal:	£.
North Western districts north of the Ganges, say.	1,000,000
Western districts	1,000,000
TOTAL £.	2,000,000

British Burmah:	
Canals from Irrawaddy and minor streams.	1,000,000
TOTAL £.	1,000,000

Madras:	
Extension of works generally, say £.	5,000,000

Central Provinces:	
Minor works generally	1,000,000
TOTAL £.	1,000,000

Bombay:	
Canals in Sindh	4,000,000
Canals in Guzerat and the Deccan	3,000,000
TOTAL £.	7,000,000
GRAND TOTAL £.	29,000,000

19. The

19. The requirements of the Punjab and North Western Provinces being best known to me, I am able to judge most exactly what sum it will there be found possible to apply usefully to this class of works. My estimate as to Madras and Bombay is little more than conjecture, but I am informed by Colonel Rundall, who is intimately acquainted with the Irrigation Works of the Madras Presidency, that the sum I have named is not in any way excessive for that territory. On the whole, there can be no reason to doubt that at least such an amount as is above given might usefully be spent, say, in the next 10 or 15 years. Allowing, therefore, for an annual appropriation of 500,000 *l.* from the revenue, which it will by remembered is double the actual rate for the last four years, a sum of something over 20 millions would remain to be provided for by special loan.

20. I think the above is a very moderate estimate of the sum that might be usefully applied to Irrigation Works within the time I have named, and I should consider that as much as 40 or 50 millions sterling could be beneficially laid out on this class of works within the next 20 or 25 years, in addition to any sums forthcoming from the surplus income.

21. If the above figures give even a tolerably close representation of the facts, they complete the proof of the proposition that it is quite impossible to do what is wanted by means of grants from the ordinary revenues. Whether the works to be carried out are in themselves large or small, matters very little. What must be regarded is the aggregate amount to be provided, and even should this be very much less than I believe it will be, the necessity for having recourse to loans to achieve proper progress appears to me indisputable.

22. But it will justly be said, that however great be the importance of the end in view, and however clear it may be that no satisfactory results can be obtained from the unaided ordinary revenues, yet the financial effect of taking up money on loan for such objects must be duly considered before the decision to do so is finally adopted. The question, in short, arises whether the additional charge that will be created can be met from the general resources of the State, while the works are under construction, or remain unremunerative. In a later part of this Memorandum I shall return to the subject more in detail; here I propose to confine myself to a statement of the conclusions which seem to me to arise from a consideration of the general circumstances of the case, adding that, from the nature of the inquiry, no answer can be given to it which is not in a great degree speculative. At the end of 10 or 15 years, if a loan of 20 millions has been contracted, a probable annual charge on the revenue will have been created of something under one million sterling. Having regard to the recent growth of the ordinary revenues, it will not be unreasonable to anticipate an increase of sensible amount in the coming 10 or 15 years. During this period it might be expected further that many of the works undertaken would have begun to pay directly; and the increased security to the general revenues obtained through their instrumentality might reasonably be expected to produce an important indirect financial advantage. Moreover, during the next 10 years the full effect of the development of the railway traffic will be felt, and the increase of the earnings will, it may be hoped, bring a large set-off against the guaranteed interest. Generally, therefore, it might, I think, fairly be anticipated that the burden caused by such an amount of debt would be met wholly or in great part by the growth of the actual income, or by the relief obtained from present losses or charges, in the manner that has been indicated.

23. Comparing the proposal to borrow such a sum as 20 millions to be applied to Irrigation Works, the entire profits of which shall go to the State, with that of giving a guarantee of 5 per cent. interest on the capital, which amounts to 70 millions, required for a system of railways for all India, in the profits from which the Government does not participate at all, it may be said with confidence that the first-named scheme is in all respects less open to risk than the last. There is literally no reason to think that, under a proper system of management, any eventual loss, however small, will arise on the Irrigation Works, while it may confidently be asserted that some of the lines of railway constructed under guarantee cannot possibly pay 5 per cent. on the capital sunk on them. It is not likely that so much as 5 per cent. will be realised within 10 years on the capital sunk on any but the smallest Works of Irrigation; but within 20 years, it is quite possible that so large a return as 10 per cent. may be realised, and it may easily be even more.

24. Nor is there reason to suppose that any greater financial discredit would attach to the Government for borrowing directly in the money market such a sum as I have named, to be applied under State management to Irrigation Works, than would be the case if the Government were to guarantee interest on so much capital to be applied under a joint stock company. Whatever have been the objections to the grant of Government aid to public works in the shape of a guarantee, it certainly has never been said that the public credit was thereby damaged. It manifestly does not signify in the very smallest degree, so far as the financial position of the Government is concerned, whether the capital on which Government has to pay interest is applied under the direction of the engineers of the State, or of a joint stock company. For the reasons that have been given in the earlier discussions on this subject, it has been considered necessary that the Government, instead of the board of directors of a company, shall stand between the individual capitalists who provide the money and the work to be carried out; but this does not in any way alter the essential features of the transaction, nor does it afford any ground for

Appendix, No. 1.

diminishing the respect of the community for the Government. On the contrary, such a policy as has now been accepted by the Government of India and Secretary of State, if firmly supported, and carried out with those precautions which prudence require, should rather tend to raise the credit of the State, as showing that the Government has confidence in the public resources, and a proper determination to develope them to the utmost. That discredit will attach to any Government that borrows to cover a deficit arising from its own bad administration is very certain; but the difference between such a case and the present one is too obvious to call for discussion. Neither in India nor in any other country can great public improvements possibly be carried out from the unaided income of the year; and it is a proposition not to be disputed, that the application of capital to such ends may be in every way as economical and prudent on the part of the Government as on that of private persons.

25. I will conclude my remarks on this part of the subject by observing that the increase in the wealth of the community, and in the amount of exportable produce, that must follow on the extension of Irrigation Works in the manner that is contemplated, cannot fail to produce a very marked effect on the profitable character of the traffic of the railways. All experience, whether in India or elsewhere, tends to show that no objectionable competition for traffic is raised up by the construction of railways and canals of navigation through the same districts, and to whatever extent the canals of irrigation can also be fitted for navigation, the result to the community will certainly be unmixed good.

26. Having thus stated the grounds on which it appears probable that a large amount will be required to be raised by loan, to supplement the grants that can be made from the ordinary revenues for the construction of Irrigation Works, if these works are to be carried out with the vigour which is desirable, I proceed to consider the measures that seem suitable for giving practicable effect to such a policy, the general expediency of which has now been acknowledged by the Government of India and the Secretary of State.

27. And, in the first place, I shall abstain entirely from any discussion of the precise system to be followed in raising the money required, as not being necessary for my present purpose. So far as the works are concerned it is a matter of complete indifference whether the money be raised in India or in England, and whether it be borrowed simply on a fixed rate of interest, or whether any special arrangement be made for admitting subscribers to such a loan to a participation in the profits to be obtained from the works. The essential consideration in determining such matters will be that the Government shall obtain the money on the best terms possible. For my own part, I suppose that the English money market will always be that in which funds can be obtained on the easiest terms; and with this remark I leave the subject.

28. Neither is it necessary to dwell at any length on the question whether such loans could be safely raised under the authority of the local governments. I conceive that so long as the responsible financial administration rests with the Government of India, and the Secretary of State, it will be thought essential that all public loans shall be raised exclusively by one or other of these authorities.

29. Passing then to those matters which call for specific attention, the first consideration should be to determine at the outset some general limit within which the contemplated operations should be restricted. It will not be desirable to leave the determination of the sum to be borrowed for purposes such as these to each occasion as it arises, because virtually this would re-open the general question of policy in dealing with every estimate, and in making the yearly grants for works in progress. To a certain extent, the Government would, under any conceivable circumstances, be forced to reckon in advance for several years the probable sums that would be required for all works of first-class magnitude, the completion of which would run over several years. Also there would be an implied pledge given on sanctioning the estimates for such works, that the needful funds would be provided year by year, until they were finished.

30. At the same time there would be a serious objection to entertaining the idea of an unlimited expenditure on this account. To do so could hardly fail to lead to want of attention to economy, and unduly to stimulate the proposals to undertake works. It is one of the most weighty arguments against the adoption of the policy of borrowing money to carry out public works, that it too often leads to a reckless prosecution of schemes, which are made to appear in very favourable colours by their projectors, and which are taken up for execution under feelings of excitement or enthusiasm, but which in the end prove to be failures. Having regard to the conditions under which office is held in India, and to the superlatively brief period for which public men here remain in authority, the risks of this sort to be guarded against in the present case seem unusually great. In this sense a specific limitation of the sums to be applied from money obtained on loan, not only as a whole, but in each separate province, seems to me almost essential.

31. Having regard to the probable magnitude of some of the works to be dealt with, the Ganges Canal, for instance, being likely to cost as much as three millions when completed, it is apparent that if a sum be fixed to limit the present extent of the operations of the State in such undertakings, it cannot be a small one.

32. On the whole, 20 millions might be named as a sum to be thus provided and laid out, say, in the next 10 years. This sum, it will be seen, bears a reasonable proportion to the total roughly-estimated amount of the outlay that might probably be beneficially applied to this class of works in the period named. It will admit of the gradual extension of irrigation on a scale that will be fairly commensurate with the vast importance of the object, in all parts of India, and on a really systematic basis, while the amount at stake will not be so large as to be likely to lead to any very serious interference with the ordinary equilibrium of the finances. Of course no more money would be taken up, year by year, than was distinctly shown to be necessary; and though 20 millions has been named, it would not follow that this sum should be spent, unless really satisfactory evidence was brought forward that works to that extent could be beneficially undertaken. By judicious management it should be quite possible to keep the expenditure, even on the largest class of works, within reasonable control, so that risk of real financial embarrassment arising from sudden pressure while such works were under construction might be avoided. The largest projects could always be so taken up that definite portions of the works should be brought into useful operation before a fresh commencement was made with a second portion; and such a rate of progress could generally be given to the works as was from time to time found suitable, having due regard to the general requirements of the finances.

33. Supposing, then, that it were determined to operate on such a general basis as is above indicated, it next has to be considered what should be the more exact mode of dealing with a fund thus created. It is clear that special caution would be requisite in many directions, and the following points are those which appear to be of primary importance.

34. *First, that due provision be made for the specific and exclusive application of the sum raised to the class of works which it is intended to produce.*

This consideration has always had much importance attached to it in the discussions on this subject that have arisen on former occasions, and it has been suggested that Special Commissioners should be appointed to raise and apply loans specially raised for such purposes. But apart from the expense of such a plan, there would be other administrative objections, and the end in view could quite easily be attained in a much simpler manner. It is already customary for the Secretary of State to obtain power under an Act of Parliament to raise money on loan. If in the Act under which an irrigation loan were raised it was provided that the money should be specially taken up and applied to this class of works, under rules to be framed by Her Majesty's Government, and published in the "Gazette," and that accounts should annually be laid before Parliament of the sums raised and of the manner of their application, all reasonable security would be given that the trust would be faithfully performed. Nor does it seem at all necessary to place any restrictions on the application of the money obtained on loan, beyond what has just been suggested. For instance, to require that the unappropriated part of the loan should be kept in deposit, and should not be available as a part of the ways and means of the Secretary of State, might be financially inconvenient and costly, and would not be of any real use. The pledge given before Parliament that the sum raised would be applied to the purposes stated, would be in every way sufficient.

35. *Second, that the aggregate of the sanctions given in detail to works to be carried out from the loan should not exceed the whole amount authorised to be raised.*

This precaution will be an obvious one.

36. *Third, that a suitable appropriation should continue to be made from the surplus income of the year for new Irrigation Works.*

The necessity for this condition is perhaps not so apparent as the former two. But it is proper to guard as much as possible against any needless borrowing, and there is really no reason for ceasing to apply the ordinary income to this class of works because grants are provided in an exceptional manner. It is just possible that in some years the ordinary revenues might supply all that was really required for the proper prosecution of the works in hand, and so far as it will go after meeting the essential demands for other classes of works, the current income should certainly be made to meet this expenditure. Moreover, there is no sufficient reason why the burden of providing works of this particular class should be entirely thrown on the future, or why a fair contribution should not be made towards them from the resources of the present time.

37. *Fourth, that the actual cash transaction connected with the extraordinary income and expenditure should be dealt with as a part of the ordinary transactions of the year, so far as the public accounts are concerned.*

This caution is essential in order to prevent complication in the accounts. All the needful security as to the proper application of the money can be quite easily got without any special accounts, as will be hereafter explained, and the importance of maintaining inviolable the unity of the general financial statements of the income and expenditure is paramount. All that will be requisite to ensure regularity is to treat the receipts from the loan as part of the income of the year; to regard the special grants for works as so much added to the ordinary public works grants of the year; and to exhibit the whole of the expenditure as ordinary expenditure against the whole grant. The detailed accounts will, under the regular system of the department, show the outlay on each separate work, and a simple statement of the amount spent on those works which have been specially sanctioned for execution under the loan will provide a sufficient explanation of the actual application of the special grant.

Appendix, No. 1.

38. These general conditions might be met under some such rules as the following:

I. The Secretary of State to have power to borrow 20,000,000 *l.* within the next 10 years, to be applied to the construction of Irrigation Works, and works subsidiary to them.

II. A separate account to be kept of the sum thus raised from time to time, and of the appropriations thereof, to be laid before Parliament yearly with the Indian accounts.

III. The appropriations to be made by the Secretary of State, on the recommendations of the Government of India.

IV. The appropriations to be made in the form of special annual grants, to be applied to Irrigation Works, in aid of the ordinary public works grants to local governments.

V. In recommending special appropriations from the loan, the Government of India will be guided by the following principles:

First. No appropriation will be made to cover charges for maintenance, or establishments employed on works in actual use.

Second. No appropriations will be made for works estimated to cost less than 25,000 rupees, unless they be minor works forming part of a system in course of execution. The same rule will apply to additions to existing works.

Third. The estimated charge for establishments and contingencies of all sorts required for the construction of works chargeable against the loan may be met by a suitable addition to the appropriations. A fair sum may be allowed for superior establishments and charges for accounts.

VI. Appropriations thus made will then fall into the ordinary ways and means of the year, and be accounted for, as also will be the whole of the expenditure, exactly as are the ordinary public works, grants, and expenditure.

VII. A yearly account of the actual expenditure on Irrigation Works specially sanctioned for execution under the loan will be prepared to compare with the grants.

VIII. If the expenditure on such works in any year is not equal to the special appropriation from the Irrigation Loan, the unspent balance will be looked upon as a sum which it is obligatory on the Government of India to re-appropriate to this class of works in the following year; and in estimating the surplus available from the ordinary revenues of the year for application to ordinary public works, a deduction should be made to provide for such special re-appropriations.

IX. The Government of India will continue to appropriate from the ordinary surplus available for works of improvement a reasonable sum for new Irrigation Works, say from about 15 to 20 per cent. of the whole grant of works of public improvement, so that a fair share of the outlay on new construction shall fall on the current revenues.

X. The account presented to Parliament will be in the following form:

No. 1.—Irrigation Loan.

Sums Raised.		Appropriations.	
	£.		£.
Balance - - - - -	5,000,000	By last account - - -	3,500,000
Raised in the year - - -	10,000,000	During the year, Bengal, Madras, &c. - - - -	6,500,000
(Details to be given.)		(Details to be given.)	10,000,000
		Balance - - -	5,000,000
Total - - - £.	15,000,000	Total - - - £.	15,000,000

No. 2.—Detail

No. 2.—Detail of Appropriations and Expenditure.

Government of Bengal.

Appropriations.		Expenditure.			
Year.	Amount.	Year.	Chargeable to Loan.	Chargeable to Revenue.	Total.
	£.		£.	£.	£.
1864-65 -	500,000	1864-65 - - -	400,000	15,000	415,000
1865-66 -	300,000	1865-66 - - -	400,000	30,000	430,000
1866-67 -	250,000	1866-67 - - -	200,000	10,000	210,000
1867-68 -	50,000	1867-68 - - -	45,000	8,000	53,000
		Total - - - £.	1,045,000	63,000	1,108,000
		Balance of Appropriations not expended -	55,000	—	—
Total - - £.	1,100,000	Total - - - £.	1,100,000	—	

(And so on for each Government.)

XI. The distribution of the actual expenditure of the year, to be charged against the revenues of the Irrigation Loan, will be made by the Accountant General, Public Works Department, on the general principles that guide the appropriations. He will also always make the full amount of the appropriation for Irrigation Works under the ordinary Budget Estimate a charge against revenue, only admitting any excess on that account as a charge against the Irrigation Loan.

XII. There shall also be submitted to Parliament a yearly statement showing all the projects sanctioned by the Secretary of State for construction from the loan, with an account for each, of the original estimated cost, the expenditure up to date, and the probable sum required to complete the works.

XIII. The total estimated cost of all such works shall not be allowed to exceed 20 millions.

XIV. The total actual expenditure to be supplied from the loan, added to the estimated outlay necessary to complete the works, shall not exceed 20 millions.

39. A few remarks may usefully be made in explanation of some of these proposals: the greater number of them are obvious corollaries to the general conclusions that have been adopted on the grounds previously stated.

40. The final responsibility of making the appropriations from the loan has been placed on the Secretary of State, because it seems quite essential, under the special circumstances of the case, to take every possible precaution to prevent unthrifty expenditure. The necessity for obtaining the preliminary sanction of the Secretary of State before *any work* is put in hand at the charge of the loan will no doubt cause some delay; but this will, I believe, be advantageous rather than otherwise. In looking at the result of operations such as these, the postponement of any work for a few months will be absolutely inappreciable, so far as the effect on the country is concerned, and everything which conduces to deliberation in the preparation of projects, and forethought in putting works into actual execution, will be a real benefit. The approval of the Secretary of State being required to the specific yearly appropriations will also perhaps tend to caution, and can do no harm.

41. The recommendations of the Government of India, would, as a rule, be accepted by the Secretary of State; but the knowledge that all questionable proposals would probably be challenged would lead to increased care in putting forward claims to participate in the grants, and the necessity for obtaining and supplying full information on every project submitted would be made more obvious.

42. The adoption, as regards this class of works, of the rule which already applies to the prosecution of all ordinary works by the Public Works Department, pending the receipt of the orders on the Budget Estimate of the year, would obviate all inconvenience from the

Appendix, No. 1.

Secretary of State's sanction being necessary to the annual grants. The rule referred to provides that all works in progress at the end of the year may go on in the new financial year, pending the issue of orders as to the amount of the new year's grant, at the same average rate of expenditure as was sanctioned for the former year.

43. I may be permitted to add, with reference to this point, that the objections which have been taken to the Budget system in its application to the operations of the Public Works Department, on the ground that under it no extensive works can be carried out, because there can be no confidence in the amount to be granted from year to year, are certainly made under a misconception. The difficulties and inconveniences referred to are indeed real, but they arise not from the Budget system as such, but from the strict limitation of the funds from which the yearly grants are made. In truth, the excellence of the Budget system cannot be better proved than by these very complaints. It provides a powerful check on expenditure in excess of the ordinary grants of the year, which is precisely what it is intended to effect. With such grants as will only supply from two to seven lakhs a year in any province for new works of irrigation, it would be unreasonable to attempt operations on a large scale; and if under the Budget system such attempts are practically prohibited, it is just what should be done. With greater latitude in the amount available for expenditure, a corresponding increased freedom in the working of the Public Works executive administration will at once follow.

44. As to the precise class of works to which an Irrigation Loan should be considered applicable, a few words may be added. Although the essential object would be the extension of Works of Irrigation, yet, inasmuch as navigation should without question be provided for as far as possible in designing Works for Irrigation, it would only be reasonable to permit all needful outlay for the proper adaptation of the projected works to purposes of navigation. In like manner, all needful contingent operations, in the way of embankment, to keep out floods, or of drainage, or of any necessary subsidiary works, would properly be provided for from the fund for Irrigation Works. As will be pointed out further on, the essential point to regard is, that the works shall be remunerative, which in brief implies that they will be profitable to the State, and at the same time to the community.

45. This concludes all that need be said as to the application of a special loan. But in entering upon the policy which certainly involves an increase to the burdens of the State to the extent of the charge of interest on the loan, while the set-off to be derived from the results of the works is in a measure problematical, further precautions will be expedient.

46. It will not do merely to trust that a suitable return will be obtained from the works constructed. The experience of the last 20 years in the Upper Provinces of India, shows conclusively that a passive attitude does not suffice. Active measures must be taken to ensure a profitable result, and exact accounts showing the real financial consequences of the operations must be insisted on.

47. The only safe basis on which to conduct any financial operation, requiring for its success a definite return on capital sunk, is to keep accurate accounts of all items of outlay and income, and to maintain a constant check on the outlay, and an equally constant watch on the growth of the income, which should be stimulated by all possible and legitimate means. This is just as essential in the case of irrigation canals as in any other enterprize.

48. In the present case we must contemplate the possibility of the Government having to meet, at the end of 10 years, an additional yearly charge of one million sterling for the interest of the money taken up on loan, and it will certainly require the greatest care and the best management to bring up the revenue from the Irrigation Works by this amount in that time. It will no longer suffice to trust to the ordinary growth of the revenues to compensate for the sum sunk in Irrigation Works. It might have been reasonable to take no special account of the exact returns of such works so long as the outlay on them was limited to grants from the ordinary surplus revenues of the year. But now a new specific charge will be created, in the expectation that the income in the end will at least cover the interest on the capital sunk; and to admit of the Government seeing how far this expectation is fulfilled, and for taking all needful measures for securing this result, accounts in a perfectly precise form will be requisite.

49. This precaution should, I think, be regarded as a *sine quâ non* before proceeding to lay out borrowed money, and the exact fulfilment of all the requirements it involves should everywhere be made obligatory, and no portion of the loan should be appropriated in any province not conforming to this rule.

50. Under this conviction it seems to me quite essential that the practice of blending the charge for land revenue with that for water should everywhere be absolutely given up, and that in all cases a specific separate water-rate should be fixed and accounted for as the revenue due to irrigation. The adoption of this system has for some years past been ordered by the Secretary of State, but I believe it has hitherto been but partially enforced in any part of India. In the North West Provinces the recent orders of the Government of India have distinctly required a complete separation of the two elements of income, and have laid down the principle that the revenues due to the canal shall be separately accounted for as such. Till now, however, the distinction has not been properly attended to. Like

remarks

remarks will apply, but in a much stronger form, to the Madras Provinces. In some few districts a separate water-rate is charged, but the rule has been to levy a consolidated rate, which includes both land revenue and the charge for water. The consequence of this state of things is, that it is quite impossible to form any just opinion as to the strict financial results of the Madras Irrigation Works. The returns of profits submitted exhibit the aggregate sum by which the net land revenue has been increased since the works were undertaken. Obviously such a standard of calculation is most imperfect and most fallacious. I do not at all question the generally useful and remunerative character of these works, but it is a plain fact that their exact financial result is still quite unknown.

51. It would naturally be everywhere left to the Local Government to determine the precise manner in which the distribution of charge between the land and water revenue should be made. It is a matter of no importance for the purposes now under consideration how the separation is made, whether in the accounts with individual cultivators or village communities, or whether only in the collectors' books. What is desired does not bind down the Government to any particular system of collection or administration; it requires only that in the final Revenue Accounts a specific sum should be credited as the income due to Irrigation Works, such sum being reckoned on the actual quantities of water supplied, and its results in increasing the profits of the cultivators. There can be no question that in all new works the best and simplest course will be to fix separately the charges for irrigation as ordered by the Secretary of State, and this should be strictly enforced in future.

52. In order to arrive at a complete solution of the question whether any given Irrigation Work is properly remunerative or not, another point has to be considered, namely, what is the interest charged fairly debitable to the work, having regard to the capital laid out upon it. It will plainly be impracticable to attempt to maintain any distinction in the accounts between capital obtained from the new loan and applied to any work, and money otherwise obtained and applied (as from the current revenues) either before or after the new system is adopted; for instance, in addition to the sum of about 2¼ millions that has already been spent on the Ganges Canal, a further outlay of, say, ¾ of a million may probably be required to complete the works. It would be a most needless complication, if not an actual impossibility, to keep separate accounts of the two classes of outlay, on one of which interest would now definitely become chargeable as a new burden. Equally impossible would it be to distinguish that part of the charge, the funds for which were provided from the ordinary revenues of the year, on which no direct charge for interest would arise.

53. It appears, therefore, that the only practical course to follow in estimating the interest charge on any work of this class, will be to take into account the entire outlay in the nature of capital on such work, and to consider the income specially charged with the payment of interest on an equivalent amount of public debt. It will be a question for consideration in detail what rate of interest should be thus reckoned on the capital. The simplest plan, no doubt, will be to charge the whole amount sunk at one rate to represent the average rate of the present debt, making due allowance for the sum that may have been provided from current revenues, on which no interest charge accrues. Probably 4 or 4½ per cent. may thus be fixed as a fair present standard.

54. This arrangement will involve no interference with the present system of public accounts, or any other that may be adopted. The whole of the actual receipts and disbursements may remain under the head of Land Revenue, Public Works, or Debt, as at present. What is proposed is only that a separate statement shall be drawn out yearly, to show what is the practical result of the Irrigation Works as a whole, regarding the entire capital sunk on them as a portion of public debt at a given fixed rate of interest. According as the net income exceeds, or is less than this interest charge, the financial result will be satisfactory or otherwise, and with such a standard of comparison a perfect check may be maintained on the general result of the operations of the Irrigation Department.

55. It will be a question for consideration what exact works, or classes of works, shall be brought forward in such Revenue Account. It might, for instance, be expedient to omit altogether such works as the minor irrigation tanks in the Madras Presidency, and to deal only with the more strictly engineering works in the deltas of the large rivers. All that is essential is that no expenditure from the loan be permitted on any work unless subject to the condition that full accounts of the entire result of that work be submitted in the way specified. It will be practically more convenient to treat the works in classes than according to individual cases, and it seems right to declare that if any work of a class receives aid from the loan, the whole class shall be brought into the special Irrigation Revenue Account.

56. It may be as well to add, that I have no intention in what has just been said of implying that tanks, as such, should be excluded from the operation of an Irrigation Loan. Clearly there can be no reason for rejecting any class of works fitted for their object; and where it is expedient, grants for tanks should be given, but always subject to the condition of specific accounts of the income and expenditure being rendered for comparison with the capital sunk.

57. The accounts to which I refer should be regularly rendered through the Accountant General, Public Works Department, and submitted to the Secretary of State; and it would be

Appendix, No. 1.

be an important duty of the Government of India to watch the condition of the balance between the income and expenditure, and to take all needful measures to ensure economy in working, and to prevent the outlay on works of irrigation remaining unproductive or leading to a permanent charge on the revenues. In this point of view, also, it should always be a condition precedent in taking up any project for Irrigation Works, that reasonable proof should be given that the returns would at least cover the interest on the capital required for the construction.

58. I now pass on to the last part of the subject, viz., the administrative steps to be taken in carrying out such a scheme for supplying money raised on loan to the construction of Irrigation Works.

59. And, first, it will be well again to state the great end to be aimed at. It is the development of a system of irrigation on such a scale, and so distributed, that the best possible safeguard shall be given, compatible with the sum of money available for expenditure, against any general disaster from a season of drought. In order, therefore, that all parts of British India shall be protected from famine, it will be desirable to secure in every province or region a certain area of land, which by aid of artificial irrigation can confidently reckon on maturing its crops, and maintaining its agricultural population and their cattle, irrespective of the vicissitudes of the ordinary seasons. From such protected areas a limited but sufficient supply of food might be distributed to neighbouring less-favoured localities, and a general immunity from the worst form of famine obtained.

60. In practice such an ideal dissemination of Irrigation Works must of course be limited by many considerations of economy and engineering convenience. Thus districts specially liable to drought would call for prominent attention. Projects already partly executed, or the designs for which were matured, might reasonably be first completed or taken up for construction. Special facilities for irrigation would properly be taken advantage of before more doubtful or difficult schemes were entered upon. The financial consideration of relieving the charges on the revenues by obtaining a full return on outlay at the earliest possible time should never be lost sight of. The adjustment of these various and almost conflicting calls will require the careful consideration of the local officers, by whom alone such schemes could be prepared and perfected.

61. It is too obvious to need more than a passing remark, that the entire responsibility of maturing and proposing any such schemes of works will rest with the Local Governments. The only duty of the Government of India will consist in seeing that due attention is given to such general principles as may be adopted by Her Majesty's Government for the regulation of the works to be taken up under the loan, and for the equitable distribution of the available funds among the various objects and localities in behalf of which aid is demanded. This general supervision would be completed under the Secretary of State in Council.

62. In carrying out such a system of works it will be important that whatever is done shall be in the way of gradual and systematic development rather than of sudden effort. It will be apparent that such an outlay as has been proposed will require, in the first instance, a sensible increase to the Public Works Establishments during the construction of the works, and subsequently a permanent addition to provide for their maintenance when they are completed. Having regard to the heavy demands certain to arise during the next four or five years in connexion with the building of barracks, it is impossible to reckon on any considerable supply of engineers being available for the extension of Irrigation Works within the ranks of the existing Public Works Establishments. Early measures must therefore be taken to supplement the engineer branch of the department, and a corresponing addition in the subordinate or overseers' class will at the same time be required.

63. The preparation of designs for Irrigation Works can only be entrusted to officers having a special knowledge of this branch of engineering, and such persons can only be obtained from among the servants of the Government in India, as it is only in this country that English engineers have the means of obtaining experience on such works. And though it is true that a few officers capable of preparing designs would soon find occupation for many executive officers, yet the comparatively small number of persons so qualified and the caution and deliberation requisite in entering on any projects which involve the risk of a large permanent charge on the revenues, will certainly lead to the lapse of a considerable lenght of time before matters are so far advanced with the preparation and sanction of projects as to allow of the prosecution of work on a large scale. On the whole, under the most favourable circumstances very active steps can hardly be taken in the manner contemplated within the next two or three years, and during this period the Local Governments would be usefully employed in reviewing any existing projects of the class to be dealt with, and in preparing fresh schemes for future execution.

64. It may conduce a more complete apprehension of the practical scope of the present proposals if I here endeavour to show in a somewhat definite manner what will be the probable demands for establishments in connection with such an expenditure as I have proposed. It will be the more useful to do this, because some persons have considered that there will be difficulty in extending the operations of the Public Works Department so as to take up the administration of a scheme of irrigation on a plan of such magnitude as to provide for the wants of the country at large.

65. The

65. The total expense of the irrigation establishments in the North Western Provinces for the year 1862–63 was about 4½ lakhs, and this is a sufficient approximation to the present scale of charge. The works provided for represent a capital of about 2¼ millions, or 225 lakhs. The annual charge for establishments will therefore be about 2 per cent. on the capital. The annual charge on the Baree Doab Canal, representing a capital of one million, is about 2½ lakhs, or 2½ per cent. On the Eastern and Western Jumna Canals the first cost relatively to their irrigating capacity has been much less than that of the Ganges and Baree Doab Canals; the establishment charges are consequently higher, and stand at about 5 per cent. It will be safe to take 2½ per cent. as an approximation to the truth. I have estimated that 6¾ millions might be spent on Irrigation Works in the North Western Provinces and Oudh, and at the above rate the corresponding yearly charge for establishment would be about 17 lakhs additional. The existing establishments of all sorts in the two provinces named cost at present about 16 lakhs, so that the strength might probably have to be doubled.

66. The calculation may be made in another manner. The charge for establishments required for construction may be considered to be about 15 or 20 per cent. on the cost of the works. If we suppose the expenditure on each separate work spread over five years, this will give an establishment costing yearly three or four per cent. on the whole ultimate outlay. The establishments required for maintenance will be sensibly less than those employed on first construction, and it may fairly be reckoned that 2½ or 3 per cent. would be sufficient for carrying on the canals when completed.

67. A like conclusion follows from considering the probable proportions between the income and charges on a finished canal. Judging from the Eastern and Western Jumna Canals, the whole of the charges on such works for maintenance is about a quarter of the gross income, and about two-thirds of the total charge is due to establishments. On a capital of 100 lakhs, the gross income being 15 per cent., the total of charges would be 3¾ lakhs, and the establishments 2½ lakhs, as before.

68. The existing establishments of the Irrigation Department in the North Western Provinces, costing 4½ lakhs yearly, consist of 32 officers of the engineer branch. At the same rate of charge about 120 officers more would be required to make up an establishment costing 17 lakhs. Also the total number of officers employed in the North Western Provinces and Oudh is now about 103, costing 18 lakhs. This indicates a probable number of about 110 officers additional, for completed works costing 6¾ millions, on which the annual charge for establishments might be 17 lakhs.

69. It may then be generally reckoned that in these two provinces an addition of 100 officers of the engineer grade might be necessary; and at the same rate for all India, after an expenditure of 20 millions had taken place, about 300 additional engineers of all grades might possibly be required. It is, however, most likely that the above estimate is in excess of the truth, as it would obviously not be necessary to increase the establishments directly in proportion to the increased extent of the works.

70. The present number of engineers of all classes employed in all India is about 580, so that the probable increase of establishments would amount to, say, 50 per cent. on the whole. The largest increase would of course take place in the first four or five years, and the chief part of the demand must obviously be met by obtaining civil engineers from England. The eventual recruiting of the establishments could cause no difficulty, as the whole number required year by year would not be likely to exceed 30 or 40, including the supply of Royal Engineer officers, the present supply being, say, 20 or 30 yearly.

71. It will be apparent from the foregoing remarks that the addition to the establishments consequent on the construction of works on such a scale as I have supposed, will be large, and might lead to the necessity for some modification of the existing system of Public Works administration. But a very slight change would suffice, I think, to meet all the requirements of the case. By entirely separating the irrigation branch of the department from the other branches, and having a distinct chief engineer and superintending staff, and by conducting the irrigation business through a separate secretary to the local government, the needful expansion of operations could be carried out without the least difficulty. The Public Works Secretary to the North Western Provinces Government at present controls establishments costing 13 lakhs, and comprising 85 officers. The estimated charge for the establishment of an Irrigation Department having charge of the whole of the North Western Provinces and Oudh would be about 20 lakhs, with 120 officers, or half as much again as the entire existing Public Works charge of the North Western Provinces. Considering that the work would be exclusively of one description, I think that such a department could be managed quite easily, though if any difficulty arose a sub-division of the territory between two chief engineers of irrigation would be quite simple, and this would probably under any circumstances be found expedient. In point of fact such an organisation has already been almost completely adopted in the North Western Provinces, and the entire separation of the irrigation branch of the Public Works Department might now be made at any time that it is thought desirable without the least trouble.

72. I have thought it best to illustrate the discussion of this part of the subject by special reference to the North Western Provinces, because it will place the whole matter in a more definite and real form than if I had dealt with the whole of the establishments of India in

Appendix, No. 1.

one body. The administration of the Public Works Department is already essentially localised, and daily tends to become more so, as the financial requirements of the Government of India become better understood, and the system of account better worked out. In proportion as the local establishments become larger, it will further become possible to make a final distribution of the engineers to all the local governments, as is now the case with Madras and Bombay, but which has not yet been considered practicable in dealing with the Lieutenant-Governorships. This, when done, will sensibly reduce the number of references to the Government of India, and facilitate the working of the Administration.

73. I feel no doubt, then, that by a suitable modification of the existing system, which would in truth be hardly felt as a change, we could obtain the expansion of the operations and strength of the Public Works Establishments requisite for the development of the contemplated scheme of works. It will, as I have already said, be the best plan to allow any such modification of system to follow rather than precede the commencement of actual operations, and the creation of a separate Irrigation Department under the local governments should only be permitted when the works are so far extended or advanced as plainly to require a distinct agency to control them. To what extent the special conditions under which Irrigation Works are managed in various parts of India will necessitate an absolute separation of administration, I do not pretend to say; and possibly some other expansion or alteration of the local departments may be found better suited to the circumstances of some provinces than that which I have indicated as applicable in the North Western Provinces. But anyhow there seems no reason to doubt that some practicable system may be found.

74. I may just allude to the possibility of the future formation of a special department under the Government of India to deal with this branch of the public works business. If it be found necessary at all, it will probably not be for some years to come, and the matter is not one that calls for any present comment.

75. Before leaving this part of the subject it is also right that I should again plainly point out that the financial stake at issue in the economical construction and maintenance of works such as these will be a really serious one. It would be most wrong to enter upon a policy of this sort without very distinctly examining the contingent expenses that will be involved in it, and especially wrong on my part to withhold a full statement of what these expenses are likely to be. At the rate of charge which may reasonably be expected, the establishments required for a system of works costing 20 millions would not cost less than 400,000 *l.* or 500,000 *l.* yearly; the charges for maintenance would be not less than 200,000 *l.* or 300,000 *l.* more; in all, from 600,000 *l.* to 800,000 *l.* The interest on the capital would be one million. Therefore the total gross charge might be over 1½ millions, possibly two millions. This, then, is the sum that has to be recovered by increased revenue. That it may be recovered, and a sensible surplus besides, is, I believe, a perfectly safe calculation; but the stake is so large that the greatest caution is assuredly called for in every step that is taken in carrying out and managing the works.

76. I have before said, that merely on financial grounds, it seems to me desirable that a specific sum should be provisionally assigned to each province, within which its proposals for Irrigation Works should be limited. The administrative aspect of the question leads distinctly to the same conclusion. It will practically be necessary to limit the yearly outlay within a certain sum, and it might be assumed that the yearly appropriation would be restricted to one-tenth of the whole loan, or to two millions. The local governments would thus have to prepare a scheme of works under which the whole of their expenditure from the loan would be arbitrarily fixed in the first place, and the yearly outlay limited to one-tenth of the whole sum assigned to each. Of course there would be no use in requiring that a complete proposal should be sent up embracing the whole of the grant, and any project could be put forward on its merits within the total allowed. Neither would any very rigid adherence to the rule as to the yearly expenditure not exceeding one-tenth of the whole be necessary in practice. But some such indication of the terms on which the grants would be made would greatly assist the local authorities in framing their schemes, in avoiding useless investigations, and in giving steadiness to the yearly outlay on the works without which the economical application of funds and employment of establishments is not possible.

77. The first practical step to be taken by the local governments under the contemplated arrangements would be to prepare suitable projects for execution. In setting about this, it should be most prominently held in view, that no scheme should be entered into which did not exhibit strong *primâ facie* evidence of being practicable and sufficiently remunerative, and that a jealous watch should be kept against waste of time and money on investigations into fanciful projects, taken up in an inconsiderate manner. Equally important will it be to resist every tendency to go into undertakings because the means of carrying them out are available, rather than because they are truly necessary for the progress of the country. In these respects a serious responsibility will rest on the local authorities. Simultaneously with the sanction of such designs the necessary authority for obtaining the requisite increase of establishments should be sought. Some moderate special staff might at the outset be allowed to prepare these preliminary reports and demands. The authority of the Secretary of State having been given to the commencement of the works, and a grant of money having been made, everything would thereafter go on without hindrance.

78. To indicate in a more definite manner the mode of going to work which I have before my mind, I may again take the North Western Provinces as an illustration; observing that in doing so I do not at all desire to put forward my own opinions as to what should actually be done, but only wish to show the nature of the process by which I conceive the systematic extension of Irrigation Works may best take place.

79. The recent orders of the Government of India as to the position of the chief engineer of Irrigation Works in the North Western Provinces, and of the superintending engineers, have already prepared the way for what has now to be done. The chief engineer has been relieved of all details of business, and complete responsibility placed on the superintending engineers. As the works are extended, a corresponding addition to the number of superintending engineers will allow of the disposal of details, without trenching on the time of the chief engineer.

80. The first matter to be attended to in these provinces is the re-modelling of the Ganges Canal. The estimates have been submitted, and orders will shortly be passed upon them by the Government of India. A distinct scheme for carrying out the operations has been called for, and any needful increase of establishment thought necessary in connection with these works should be at once provided for.

81. The detailed designs for the re-modelled works will have to be prepared under the chief engineer. For this he should have a suitable subordinate staff. This staff would henceforth become a permanent addition to his office, to assist in the preparation of new projects.

82. An officer has already been placed in charge of the Irrigation Works in Rohilkhund. He should receive such moderate additions to his staff of assistants as will admit of the speedy execution of all needful preliminary surveys, from which a conclusion may be formed as to the more exact inquiries to be put in hand. In personal communication with the chief engineer the condition of the existing small canals should be discussed, and any needful steps should then be taken to complete them, or make them more effective.

83. Later, specific surveys and projects for additianal works might be put in hand. The formation of permanent head-works for the Ganges Canal should be taken up in connection with the possible formation of a canal on the left bank of the Ganges into northern Rohilkhund.

84. A preliminary investigation should also be made, as soon as a competent officer becomes available, into the best way of dealing with the waters of the Sarda and Gogra in connection with an Irrigation Canal for Oudh and the districts of the North Western Provinces between the Ganges and Lower Gogra. This will be a very important work, and will require much time and labour for its completion.

85. For several years to come the above will, without doubt, give full employment for the Irrigation Department between the Ganges and Gogra. Hereafter the districts north of the Gogra might also be examined.

86. The officers of the Eastern Jumna Canal should take up, in concert with those of the Western Jumna Canal, as early as is convenient, the project for permanent head-works for these canals. The execution of this work may probably be best left with the Eastern Jumna Canal staff, as the works of the Western Jumna Canal still require a great deal of attention, while the sister line in the Doab is in a fair state of completeness.

87. As early as possible, a selected officer should be deputed to Bundelkhund to resume the development of Irrigation Works in those districts which are in special want of such protection. The operations here would most likely mainly involve the formation of numerous small reservoirs, though the larger streams may be found to give a perennial supply of sufficient volume to make it profitable to draw canals from them also. The intermixture of Foreign with British territory in his province may render necessary some special arrangements before work is taken up. But if the Foreign States would agree, as it is probable that they might, to allow the British Government to undertake works of joint utility, the idea of obtaining water under such circumstances should not be rejected. Some preliminary negotiations in this sense may be desirable in case of a first examination indicating the probability of satisfactory results from any such joint work.

88. The suggestion lately made by Captain Crofton, that a dam should be formed on the Jumna below the junction with the Hindun, seems another scheme calling for early attention, both as regards the interests of the lower part of the Doab and of the districts of Muttra and Agra, to which water might probably be led from such a work. The improvement of the Eastern Jumna Canal as a navigable line also will have to be attended to.

89. Lastly, the possibility of utilising the waters of the Tonse and other neighbouring rivers in the districts of Allahabad, Mirzapoor, and Benares might be investigated. This would complete the circuit of the districts of the North Western Government.

90. The gradual investigation by properly qualified officers of the schemes above referred to could be carried out without making any important increase to the strength of the establishments. As soon as any work was put in hand on a sufficiently extensive scale an additional superintending engineer could be nominated to take charge of the details of design or

Appendix, No. 1.

construction, and eventually, if the necessity were shown to exist, the general supervision of the works might be divided between two chief engineers, both of whom would be subordinate to the officer in general charge of the Irrigation branch of the department under the local government.

91. As these investigations proceeded, and the works designed consequent on them were put in hand, a gradual extension of the executive staff would take place, and when the time should seem ripe for the separation of the Irrigation branch from the rest of the Public Works business, the chief engineer of Irrigation Works would become a separate secretary to the local government for this special department.

92. It seems probable that the convenience of the administration will be best served by maintaining a single accounts office for the whole department, though any special subdivision of the establishment might readily be made which was found to conduce to the satisfactory dispatch of business, and the maintenance of the needful financial control over the results of the works, the great importance of which I have more than once urged.

93. The above will sufficiently illustrate the manner in which I view the proper mode of dealing with the general question. It should be on some such review of the probable requirements of the several provinces, that a preliminary distribution of the sum named as the first limit for an Irrigation loan should be made among the various Governments. My own estimate, already given, is confessedly too vague to serve for anything more than a general guide to a decision as to the *total* sum to be fixed. The local governments should be requested to form the best calculation in their power of the sums they could usefully spend within a maximum of five or six millions each during the next 10 years, stating in the most definite way possible the nature of the works they propose, and the grounds on which their estimates are based. On these data, the Government of India and the Secretary of State could settle a first appropriation of whatever sum be named, as the limit of a loan, and the local authorities could then proceed to prepare definite projects for the works to be taken up. I have already fully stated the views I hold as to the principles on which final authority should be given for commencing operations, and with these explanations as to the system that might be adopted in putting the whole scheme into action, I close what I have to say on this part of the subject.

94. For facility of reference, it will be convenient if I briefly recapitulate the principal points discussed and conclusions adopted in the foregoing paragraphs:—

I. It is first shown (paras. 6–15), that the probable sum to be regarded as available for Irrigation Works from the ordinary annual income, does not exceed 30 lakhs for all India, and that 50 lakhs is an outside sum.

II. That the sum likely to be required for a proper extension of this class of works in the next 10 years is not far from 30 millions (paras. 16–19); and that a loan of about 20 millions would be necessary to carry out the works with satisfactory vigour.

III. That to contract such a loan for this purpose would not bring financial discredit on the Government, and would be far less open to objection financially than the operation of giving a 5 per cent. guarantee on 70 millions of railway capital (paras. 20–25).

IV. The necessity for specifically limiting a loan for such objects is shown, and 20 millions proposed as the sum to be fixed for the next 10 years (paras. 26–32).

V. The special precautions necessary, in raising and applying such a loan, are discussed (paras. 33–37), and definite regulations suggested for the purpose (paras. 38–44).

VI. The extreme importance of requiring exact accounts of income and outlay of all works constructed from the loan is affirmed (paras. 45–49).

VII. The necessity for the separation of the charge for water from that of land revenue, in the public accounts, is urged (paras. 50–56).

VIII. The Government of India should carefully watch the Revenue Accounts of all Irrigation Works, and no work should be allowed to be begun which does not promise to be fairly profitable (para. 57).

IX. The end to be aimed at in carrying out works as proposed, will be the protection of the whole country from the worst consequences of famine (paras. 58–60).

X. Works to be originated by the local governments and taken up by degrees (paras. 61–63).

XI. Probable requirements for works costing 20 millions in respect of establishments discussed (paras 64–68); and probable increase of about 50 per cent. to the present total strength shown to be necessary and practicable (paras. 69, 70).

XII. Such an increase would be quite compatible with the efficient working of the present system of administration (paras. 71–74).

XII. The

XIII. The general financial result of such works stated (para. 75).

XIV. Practical measures to be adopted for carrying out such a scheme illustrated and explained (paras. 76–92).

95. The discussion of the various subjects which have been under consideration in the course of this inquiry has, then, led me to the conclusion that the State cannot attempt to take up the construction of Irrigation Works on a scale of sufficient magnitude, without having recourse to a loan to supplement the funds available from the ordinary revenues. I have indicated the sum the expenditure of which seems to be necessary for satisfactory progress, and what precautions should be taken to secure the proper application of a loan, and the economical construction and management of the projected works. These proposals constitute, I believe, a practical scheme, such as has been asked for by the Secretary of State. The important question, however, still has to be answered, whether, having in view the obligations of the Government to the country to provide works of irrigation on the one hand, and the financial risks that seem inseparably bound up with State operations, on the other, the conclusion before adopted, chiefly on an administrative view of the subject, shall or shall not be confirmed.

96. To admit of a satisfactory answer being given to this question, it will be desirable to examine, as precisely as can be done, the liabilities which the Government would incur by the adoption of the policy, an outline of which has been sketched out. And in the first place it is necessary that I should point out that the figures I have used throughout my argument, have been intended to represent outside sums. For the reasons already explained, many difficulties and delays must attend the commencement of such a system of engineering works, and the actual expenditure during the first five years would, under no circumstances, be likely to come up to five millions. In the first 10 years a total outlay of 15 millions would be a large sum. At this rate, for the first five years, the interest charge might average, say, 10 lakhs yearly, with a maximum of 20 lakhs; and for the second five years, might average 50 lakhs, with a maximum of 75 lakhs. It will, I think, be reasonable to reckon that under a system such as has been proposed, the revenues from Irrigation Works in actual operation will, in these intervals, have so far increased as to meet the needful increase of charge on account of additional establishments, &c., for new works, so that the maximum additional charge at the end of 10 years is not likely to exceed 75 lakhs.

97. For my own part, I cannot look upon this as constituting any real financial difficulty. In the first place, supposing that there were absolutely no increase of ordinary revenue mean time, or that the increase were absorbed by other increased charges, still a sensible portion of this interest charge could be met from the ordinary public works allotment, on the present standard, which, as I have pointed out, might be made to bear a charge of something like 50 lakhs yearly. In the next place, if it were really necessary, there could be no more reasonable ground for temporary additional taxation than the provision of funds for such works. Lastly, the charge for interest, so far as necessary, could be met directly from the loan without the smallest objection. It is purely a question of detail, so far as the position of the Government is concerned, whether the interest be paid from one nominal fund or another. In point of fact, the works to be constructed will actually cost not only the sums directly applied to them, but, in addition, the interest paid on that sum until they become remunerative. Supposing any individual work to take five years to complete, and five years more to elapse before it produced a net income of 5 per cent., the interest sunk might approximately be reckoned at 5 per cent. for five years, or 25 per cent. on the whole outlay. In many cases it would be less than this, and in some more, but the above hypothesis may fairly be taken as an average result. If this interest be met from the revenues, year by year, it is obviously equivalent to a direct contribution of the same amount being made to the new works from that source; if the interest falls on the loan, the whole charge appears against it. *In either case the cost is identical, and the only essential consideration is, whether the works, when constructed, are really worth the whole sum required for them.* Exactly the same thing will be the case if the works were undertaken by a company.

98. The fundamental point therefore that requires such careful attention is not, how shall the interest of an Irrigation loan of 15 or 20 millions be paid for the next 10 or 20 years, but will the works in the end be really remunerative, allowing for the sum sunk in interest, before they come into full operation. If the reply to this last question is in the affirmative, the Government need have no difficulty in borrowing whatever money is necessary, and at once entering on the construction of the works; and here, in fact, is the point where doubt may arise. It is obvious that no conclusion can be come to either way, that is not more or less founded on conjecture. I have already stated my own belief that, with proper caution, the works to be carried out with the proposed loan might certainly be made directly remunerative, though great care will be necessary to ensure this. It cannot be denied that there is risk of disappointment in such operations, but what evidence we have is much in favour of Irrigation Works, properly designed, executed, and managed, proving highly remunerative as an investment of capital.

99. For these reasons I consider that whatever be the eventual amount which the Government might determine to raise by loan for Irrigation Works, the only considerations, so to speak, of real moment are, that the projects taken up shall be sound, and that the works, when brought into operation, shall be made remunerative. It will be impossible to lay too much

Appendix, No. 1.

much stress on this last-mentioned condition, which should be regarded as the fundamental principle on which the management of an Irrigation Department should be worked, just as the maintenance of the equilibrium between income and expenditure is of primary importance for a proper administration of the finances.

100. The limitation of the sums to be raised by loan, as it seems to me, is rendered desirable, not so much on any considerations of finance, properly so called, but because by such a restriction of the funds greater care will be enforced in their application, and closer attention can be paid to economy in administration.

101. Lastly, in weighing the moral obligation that rests on the Government to provide Irrigation Works for India, we not only have to regard the contingent danger of financial embarrassment arising from the works proving unremunerative, but likewise the serious administrative difficulties that stand in the way of handing over their construction to private persons or companies. It will not admit of dispute that the Government must either heartily enter the field on its own account, or give every facility to private capitalists to carry out this class of works. The final question therefore becomes this:—Are the financial risks to the Government, likely to arise from its undertaking Irrigation Works on a sufficient scale, so great as to make it expedient to face the many grave difficulties that beset the entrusting their construction to private persons? The answer seems to me quite easy, that the risk would be almost nominal, and that the objections to placing the agricultural population in the hands of private capitalists for the supply of water for irrigation are palpable, and have never been met. Nor, in reckoning the risk of failure, is it reasonable to disregard the advantages to be secured by success. If there is any one thing which the British Government may be fairly regarded as bound to do for the people of India by all the laws of good government, of civilisation, and of humanity, it is to take all practicable measures to secure them from the greatest physical calamity to which mankind is liable, the curse of famine and starvation. That a remedy almost complete is to be found in the sufficient extension of Irrigation Works is the general belief of the persons best qualified to judge of such matters, and in that belief I fully participate. If some financial risk has to be faced for such an object, surely the arguments for so doing are at least as strong as those which have induced the Government to involve itself in liabilities probably ten times as great, for the purpose of introducing railways into India. And should some actual additional charge have been met for a few years to secure such an end, there is no object on which the revenues of the country can be more righteously spent than that of providing the agricultural population with a permanent protection from the most terrific calamity that can fall upon them.

(signed) *R. Strachey*, Colonel, R.E.,
Secretary to Government of India, Public Works Department.

Calcutta, 10 February 1865.

Appendix, No. 2.

PAPER put in by Lord *George Hamilton.*

MINUTE by His Excellency Sir *John Lawrence,* Governor General, dated 9th January 1869.

Appendix, No. 2.

Railway Extension in India.

In my Minute of the 16th August 1867, I drew attention to the altered position in which the Government was placed in relation to railway extension by the conclusion virtually adopted by the Secretary of State, that the necessary capital for railway construction could not be obtained without a Government guarantee of interest. I referred to the power which the Government could hence exercise of directing railway extension in the manner it pleased, and I expressed an opinion that the time had come when a general review should be taken of the requirements of the country in respect to railways, with the intention of determining what was the best course to secure their further development. These views were generally assented to by the Council, and early in December instructions were issued to all the local governments to report their conclusions on the main questions that arise in connection with railway extension.

2. In the following January, and I believe quite independently of the steps which had been thus taken in India, the Secretary of State addressed a Despatch to the Government of India, embodying opinions as to the expediency of making a comprehensive review of our railway policy, hardly differing from those expressed by me in the Minute I have above referred to. This agreement, that the time has come for considering how the further extension of railways in India may be best brought about, is satisfactory, and may, I hope, lead to the early adoption of practical measures for giving effect to the object in view.

3. It is hardly necessary for me to do more than refer to the value of our railways to the Government and the people as facts universally acknowledged. These works not only add vastly to the available force of the executive power, but greatly conduce to improved administration by expediting communications, and facilitating personal intercourse among the officers charged with the administration, and between these officers and the public. Their effect on the commerce of the country is most conspicuous, and extends, I am led to believe, far beyond the limits commonly ascribed to it. It is a moderate estimate to reckon that the construction of railways has reduced the cost of transport one-half; that is to say, that as much is saved to the public as is paid by them to the railways. The saving to the traders and travellers of India, caused by railway transport, may thus not unreasonably be reckoned to amount at the present time to a sum of more than five millions sterling in a year.

4. It is clearly proved, by the experience of the past, that railways in India, if constructed with due regard to economy, and under conditions which fairly justify such undertakings, may be commonly expected to yield returns sufficient to cover the interest on the capital required for them, within a period of from 10 to 15 years from the time of opening their whole length. There are certainly railways which do not now nearly pay the guaranteed interest, and which cannot be expected to do so within any definite period. But it may be generally affirmed that, excepting the lines which it was well known beforehand were not likely to pay, and which were undertaken on grounds of policy, the financial failure of Indian railways will be found to be directly attributable to mistakes or mismanagement in construction, or to a line having been constructed in defiance of what prudence dictated.

5. Nor is that all that can be fairly said of India in respect to railways. It is not to be questioned that, if a more strict economy had been exercised in the construction of some of the lines, they would at the present time have been paying a large dividend, and that, even heavily weighted as some of them are with excessive capital accounts, their ultimate financial prospects are still good.

6. But although it is thus true that, as a whole, we may reasonably expect railways in India to be eventually remunerative if prudently executed, it nevertheless is almost a necessary condition of their construction that, for many years after opening, the net profits will not cover the interest on the capital, and that the Government has to pay a considerable sum to make up the full amount of interest guaranteed. Hence it follows, that the questions likely to cause hesitation in the extension of railways in India refer almost exclu-

Appendix, No. 2.

sively to the extent to which the public revenues can be made to bear the charge for guaranteed interest, during the first years after the opening of new lines, when the net income is not sufficient to meet that charge. This drain on the revenues will be continued for the whole period during which construction goes on, and until the last made lines become self-supporting. It is evidently only by gradual and steadily maintained action that the wants of so large a country can be supplied, and, taking the most sanguine view of such matters, it seems impossible to reckon the period required for the co-operation of the Government at less than 30 or 40 years, which for all practical purposes must be regarded as an indefinite term. The position, therefore, is not one in which a burthen is to be placed on the revenues for a special purpose for a short time. If this were the case, the propriety of meeting the charge for guaranteed interest by loans would at once be suggested. But for what must practically be regarded as a permanent charge, this resource seems to me inadmissible.

7. There are other reasons which support this conclusion. First, the amount which England can supply for Indian investments without raising the rate of interest is assuredly limited, and experience seems to show that no great reliance can be placed on India itself for the supply of funds; at the same time, the demands for capital on account of railways and irrigation works for many years to come will necessarily be very heavy; hence, it becomes important to give the largest possible contribution from the yearly revenues for these purposes. Second, there are political considerations, to which I have before drawn attention, opposed to the continued increase of a public debt to be held in England, the interest on which would be dependent on the revenues of India. Third, if it be proper to contemplate the formation of a sinking fund in any shape, by help of which the Government would eventually become the proprietor of all Indian railways (and that this should be, I have no sort of doubt), then it is manifestly a wrong policy to add to the debt now to be incurred for railway construction any sum which is not strictly essential. The same arguments apply in every respect to the proposal which has been made by some authorities of adding the guaranteed interest to the capital accounts of our lines.

8. Under these circumstances, the only really safe course for the Government to pursue, in dealing with railway extension in the future, is to estimate the sum which from time to time can be fairly taken from the yearly income of the country to assist the construction of such works, and then gradually to extend the system of railways in such a manner as to keep the annual charge on the revenues as close as is practically possible to the fixed sum appropriated for the purpose. As the receipts of the older lines increase, and the charge for interest on them diminishes, new lines would be brought forward, so as to keep up the aggregate contribution in the form of interest to the proper amount. This view has been assented to by the Secretary of State, and it seems not open to question. Blindly to enter upon an indefinite scheme of railway extension, without considering the financial results of so doing, merely trusting to the probable growth of the Indian revenues to make good all necessary charges for interest, is a course which has been advocated, but which cannot be seriously discussed by those responsible for the finances of the country. To the full extent to which we are satisfied, after due inquiry, that it is from time to time safe for us to go, let us go. But no progress can be real or permanent which is not consistent with a healthy condition of the finances.

9. On examining the conditions under which the State is now called upon to make good a part of the guaranteed interest on Indian railway capital, it at once becomes clear that the liability of the Government to a permanent and probably increasing charge on the revenues is much increased by the arrangement under which the Government can derive no profit whatever from the most successful railway, while it bears the entire loss of those which do not pay. There is no set-off or profit against loss in the Government share of these transactions. The whole profit goes to the companies, and the whole loss to the Government. It therefore follows, almost as a positive certainty, that there will be a permanent charge thrown on the Government for guaranteed interest so long as the present system continues.

10. I am thus led to ask what are the reasons which should induce the Government to accept the position in which it is placed by the present system of railway construction, under which the entire risk and actual loss is borne by the State, while the whole of any eventual profits is enjoyed by the companies to whom the railways are conceded? Can it be really essential for satisfactory progress that such a distribution of the losses and gains should continue, and is there any sufficient ground for placing the State in so false a financial relation to the constructors of railways as that under which the former must bear all loss, and cannot possibly obtain a set-off by any gain? These questions involve the discussion of the character of the agreements which have till now been entered into with companies for the construction of railways in India, and the policy under which these works are entrusted to companies, in preference to being executed by the direct agency of the State.

11. It is often objected to the prosecution of public works by the Government, that it is not proper for the Government to interfere with private enterprise (which is said to be the proper agency by which works like railways should be carried out), and that the Government should not tae advantage of its position to prevent the investment of capital by private persons in large public works. Now, the Government of India has for several years been striving to induce capitalists to undertake the construction of railways in India at their own risk,

risk, and on their responsibility, with a minimum of Government interference. But the attempt has entirely failed, and it has become obvious that no capital can be obtained for such undertakings otherwise than under a guarantee of interest, fully equal to that which the Government would have to pay if it borrowed directly on its own account. It is an abuse of language to describe, as an interference with private enterprise, what is only a refusal to support private speculators and to guarantee them from all possible loss by the credit of the State, or to allege that the investment of capital by private persons is hindered by the Government executing works, when private persons refuse to do so at their own risk. To speak of the Government as though it were a speculating corporation, desiring to benefit itself at the expense of the community, or any section of it, is an absurdity. The Government is bound to protect the interests of the public, and it has to consider what is the proper course to follow in carrying out railways, having regard to the true interests of the people of India. The question now before us is, whether it is reasonable, or consistent with the true interests of India, to continue a system under which the revenues have to bear the whole risk and loss, and can derive no direct benefit from railway construction, in preference to one under which, with a risk certainly no greater, and probably much reduced, the whole of the direct profits can be added to the public revenues, and made available for reducing taxation, or preventing the imposition of new burdens.

12. To the English investor of capital it certainly is a matter of very small importance whether the Government of India induces him to supply money under the name of guaranteed railway capital, or directly borrows from him by an ordinary loan. A reference to the price lists of Indian Government securities and railway stocks will at once prove the truth of this. The 5 per cent. stock of the Secretary of State, the interest of which is payable in London from the revenues of India, is quoted, 28th November 1868, at about 116. The 5 per cent. stock of the East Indian Railway, with interest payable in London, stood at the same time at 109. The 5 per cent. debentures, the interest of which is payable in Calcutta, stood at 106. It is manifest that the 5 per cent. Government Stock raised by the Secretary of State under Act of Parliament is more highly valued in London than the best railway stock, though so far as I am able to perceive, the security is identical. In Calcutta the best quotation of 5 per cent. debentures, those to run 15 years, is now 109, or the same as the East India railway stock in London. In the face of such figures, it seems impossible to say that there is any appreciable preference given to investments in railway stock.

13. The Secretary of State, in paras. 10 to 17 of his Despatch, No. 90, dated 24th November last, in which he discusses my Minute before referred to, practically admits that Indian railways do not offer a very attractive form of investment to English capitalists, when he affirms that, in order to secure the favour of English investors, the Government must make various concessions to companies on matters in respect to which I, and the whole of my colleagues in the Government of India, had expressed opinions that greater stringency was required to secure satisfactory results in the construction and working of Indian railways. Admitting fully that the Secretary of State is likely to have better opportunities of judging of the temper of the London money market than we can have here, it is, I think, but reasonable to claim for the Executive Government in India the advantage in judging of what is, and what is not, conducive to economy and satisfactory working of the railways themselves. The issue thus raised is, whether the agency of the companies affords any such special public convenience or advantage as to justify the Government in giving them terms which are alike unsatisfactory in a financial and an administrative point of view.

14. The only possible reply to this question seems to be in the negative. There is every reason to think that the Government would have at least as great facilities in raising directly by ordinary loans of money needed for railway construction as it has in obtaining subscriptions to the capital of guaranteed companies, while the former system of obtaining the money would leave the Government entirely unfettered in every subsequent process connected with construction and management of the lines, could cause no greater liability for interest, would almost certainly lead to a reduction of charge in consequence of greater economy, and lastly, would give to the revenues of India the full advantage of any eventual surplus income after discharging the interest on the borrowed capital.

15. The only doubt that could be thrown on the expediency of direct Government action in the construction of railways, would be the presumed incapacity of the Government to carry out or manage these undertakings. The Government of India has not yet done it, and therefore it is impossible to adduce direct proof in support of my views. But it seems to me to be a matter on which there is in truth no room for doubt if it be viewed dispassionately. The history of the actual operations of railway companies in India gives illustrations of management as bad and extravagant as anything that the strongest opponent of Government agency could suggest as likely to result from that system. Some of the best constructed and most economical Indian lines have been carried out entirely under departmental management, in a manner which differs in no respect from that commonly followed on Government works. Many of the very largest railway works have also thus been carried out in all parts of India. So far as contractors' agency is desirable, it would be quite as much open to a Government management as to a company; and the instances of flagrant failures of contractors under the Indian companies are so notorious as to leave no ground for thinking that, in this respect, the Government could manage worse. With reference

Appendix, No. 2.

to the Indian agency, both of engineers and other officers, it may quite safely be said that the Government, under a reasonable system, could, to say the least of it, secure as great ability with an equal outlay. I have not heard of any useful independent action taken in relation to Indian railways by the London Boards, which would be lost under a well arranged system of Government management. In no single respect can I see that less efficiency is likely to be secured under direct Government control than under joint stock companies having their boards in London.

16. Whatever opinions may be entertained on the relative merits of the two sorts of management on other points, it cannot, I conceive, be seriously denied by anyone that direct Government management is likely to be more economical than that of companies, and it was mainly on this ground that I understand this Government to have determined to carry out the railway from Lahore towards Peshawur by its own engineers. Of this line it may be almost certainly affirmed that it cannot possibly pay the interest on the capital required, within any time that can be named. Hence it becomes specially important to secure the strictest economy, and therefore the Government desires to retain the whole concern in its own hands.

17. The Secretary of State, in his Despatch, No. 3, dated 16th January 1868, assents to the Government carrying out by its own agency what he has termed "political" lines, while he reserves what he calls "commercial" lines for guaranteed companies. After a careful perusal of what he has said on this matter, I am unable to see that there is any other distinction between these proposed classes of railway, than that the political are those which are not likely to pay, and the commercial those which are likely to pay, a dividend in excess of the ordinary rate of interest. The Government, therefore, is to take up all the unprofitable lines for itself, and give all the profitable lines to private speculators, carefully guarding them, however, at the expense of the State, against any possible loss, whether due to their own negligence or not. Stated thus nakedly, the position in which the Government would be placed by such arrangement appears in its true character. The worst features of the present system would remain, and the Government, though relieved from some financial loss, would soon find itself with authority still weaker than that which it now feels to be insufficient. It would suffer in reputation from the results of the management of its own lines of railway, which would necessarily be everywhere unsuccessful. The true cause of this would certainly be overlooked, and the discredit of financial failure would be used as a weapon against it in all its relations with the companies.

18. The specific reason assigned by the Secretary of State in this Despatch for the Government undertaking the unprofitable lines is that, if this were not done, it might lead to the market being weighed down by railway securities, not likely to rise to a premium. In the interest of the companies, the force of this argument is of course evident, and if the Government had any sufficient reason for desiring to improve the condition of the companies at the expense of the revenues of India, there might be nothing further to say on the subject. But I am not able to see that there can be any advantage to India in sustaining the value of the guaranteed railway stock by transferring, to be borne by the general revenue, charges which might otherwise have been met by the surplus railway profits, and by handing those profits over to the holders of the guarantee stock, who have earned them neither by enterprise nor self sacrifice. If there were any reason to suppose that the intervention of the guaranteed companies is essential, either for raising the money required for the extension of railways in India, or for executing the works, these concessions might be justified. But, so far as I am able to judge, the facts are directly opposed to any such conclusion. The experience of 20 years seems to show sufficiently that there is no reason whatever to expect that the Government can derive any financial advantage from the adoption of the system of guaranteed companies in supplying the capital required for railways, unless such company actually execute railways, and work them very considerably cheaper than the Government could do through its own agency. My own very decided opinion on this point is, that the direct agency of Government would certainly be more economical than that of the railway companies, and that there would, in almost every respect, be advantage to the State financially, and therfore to the community of India at large, if the Government were to determine to carry out railways hereafter through its own engineers, with money directly borrowed in the market for the purpose.

19. It is not to be questioned that the existing machinery of the Public Works Department is not suitable for the prosecution of railways on a large scale. But I see no reason for anticipating difficulty in making arrangements which should be perfectly satisfactory and efficacious. I feel confident that there would be complete unanimity on this subject among the public works officers of the Government most to be trusted. The Government is already making arrangements for the commencement of the railway towards Peshawur, which, with suitable expansion, would readily suffice to secure the prosecution of like works elsewhere. There are enough of our own officers in the chief provinces of India conversant with railway business, and having local experience to ensure the satisfactory working of a special staff of railway engineers, &c., under direct Government control. No objection which may be taken to the present public works system can properly apply in this discussion, the operations which are now carried out by this department being of a character requiring a totally different treatment. The outlay on public works in India has avowedly been treated as mainly dependent on the existence of a surplus revenue, which can usefully be applied in this way so long as it exists, but which immediately becomes

available

available for other purposes if pressure arises. It is unreasonable to think that if the Government deliberately borrowed money specially for railway construction, the works would be stopped on every occasion of temporary financial difficulty, as has been alleged.

20. There is no reason whatever for supposing that in times of serious political danger or war, the power of companies to obtain money for investments in India would be greater than that of the Government; on the contrary, the credit of the Government under such circumstances must necessarily be the better of the two. So far as my recollection serves me, one of the most important advantages which it was originally considered that companies would have over the Government in railway construction was that the companies would have greater facilities for raising money, and could be better relied upon to carry out the works vigorously and without stoppage in time of financial difficulty. Recent experience has shown that this is very far from having been the case. After the last monetary crisis in England, the Government was obliged to lend money to several of the companies to admit of the necessary capital being provided; and the superior credit of the Government, and its power of meeting difficulties of this description, were most strikingly exhibited. So long as the actual liability to pay the interest falls upon the State, as would be the case whether money were provided by loan directly or as guaranteed capital, it is evident that the standard which regulates the rate of interest that must be paid to command money will be the probable solvency of the Government. The intervention of a company could not add to the security in the smallest degree, nor to the facility of obtaining money, nor would the Government thereby be freed from the pressure caused by the necessity of paying the yearly interest. All presumed financial advantage in the arrangement with the companies I consider, therefore, to be entirely fallacious.

21. Another fallacy may be noticed which has been introduced into these discussions. It has been said that there is direct advantage to the State from the arrangement under which it advances money in the form of interest to the companies in the earlier years of railways, which is returned as the lines begin to yield a profit in excess of the fixed rate of interest, and that this is a convenient form of saving money. But it is plain that if there be any advantage in this it applies to the case of direct Government agency just as much as in the case of the companies, with this important difference, that on the present plan only half the surplus net income in excess of the fixed rate of interest comes to the Government, whereas, under direct Government agency, the whole profits would so be received by Government. At the present time the sum advanced for guaranteed interest is about 13½ millions. Before this can be repaid by the companies, the profits in excess of the guaranteed interest must be 27 millions, the companies themselves taking half the excess, and so greatly deferring the time when the debt could be cleared off, beyond what would have been possible if the lines had been directly under Government. I would add also, that it is a serious mistake to think that any repayment of the guaranteed interest worth mentioning has yet begun, or that there is any present prospect of such repayments being made to an extent which would sensibly affect the public income.

22. But it is not necessary for me to discuss this part of the question at greater length. I have on former occasions stated my opinion that, for the future, railways should, as far as is consistent with actual and implied engagements with the existing companies, be carried out by the Government itself, and my later experience and reflection have fortified that opinion. My objections to the present footing on which the railway companies stand in relation to the Government have been fully explained in my former minute, and with one exception, I need not revert to them in detail. It will suffice to say generally, that if it be determined to continue the construction of railways through companies, all the precautions and checks which I before recommended still seem to me to be necessary and proper, and appear to have been misapprehended in several respects by the Secretary of State in his Despatch of the 24th November, and that in proportion as the probability of a line being remunerative is great, in the same proportion is it reasonable for the Government to insist on its own terms being accepted. The one point to which I will again call attention is, that there are political reasons of serious weight, which should lead us to be very careful how we attempt to carry out railways in the states of the foreign princes of India, through the agency of companies. These reasons apply, in my judgment, with special force to the States of Rajpootana and Hyderabad. The Secretary of State has not alluded to my remarks on this subject, which, however, seems to me of so great importance as to make me again request special attention to it.

23. Whatever is the decision as to the agency by which the actual works are to be constructed and managed, some improved system of check and review of the financial results of our railway undertakings is assuredly necessary. As I have before said, future progress in railway extension will directly depend on the continued appropriation of a determinate annual grant from the revenues, to cover the interest on the capital employed until the lines become sufficiently productive to pay the whole amount. To secure the best practicable application of the limited sum that can be granted, having regard to the general condition of the finances, it will be essential to keep a constant watch on the whole series of undertakings and on their progress, both material and financial. The manifest object to be attained, is the greatest general advantage to the country in the form of railway transport in the shortest time, through the annual expenditure of a certain fixed sum of money. Where the demands must, in the nature of the case, so greatly exceed the power to comply with them at once, it becomes doubly necessary for the controlling financial authority to be watchful

Appendix, No. 2.

and to act on a well-arranged plan, carefully considered beforehand. I can conceive nothing more completely opposed to such a system of control and guidance of railway construction than that which, as a fact, has existed till the present time; and a very little examination will, I think, satisfy most people that this is a correct view of the case.

24. The ultimate test of the success of any system must be its results. Now going back only to 1865, I find that in that year the estimated sum required to complete the authorised lines, aggregating 4,900 miles in length, was 77,000,000*l.* At the present time the estimate has already reached 97,000,000*l.* for a length of 5,859 miles, and the actual amount needed is more likely to be 100 millions. Thus with an increased sanctioned length of 959 miles, the estimate for which is 9,500,000*l.*, there has been an addition to the probable outlay on the old lines of about 10 millions, and perhaps as much as 13 millions, without any extension of their actual length. If the comparison had been made with an earlier period, the result would have been still more unsatisfactory as regards the growth of the guaranteed capital, without any commensurate extension of the mileage of railways for the country at large, and with a tendency to stationary traffic returns.

25. It may be replied to these comments, that the increased outlay on the old lines was necessary, and that by help of it improved conveniences are, in fact, given, or will be given to the country, and to some extent this may, no doubt, be true. But the essential matter is not this. What is necessary is to see that the application of new capital shall be the very best possible, taking into consideration not only the old lines, but the demands for altogether new ones also. For my own part, on now looking back, I think there can be little doubt that a very considerable proportion of the capital which has, in fact, been applied to the older lines in the last five or six years might, with greater advantage, have been given for the commencement of new lines. The experience of India in respect to the growth of railway capital is thus beginning to teach the same lesson that has been taught on a gigantic scale in England, namely, the urgent necessity for resisting the tendency to incur additional capital outlay, without creating clear additional paying power in return. The enormous and ruinous extent to which the capital accounts of many English companies have become inflated has been for some time past the theme of public discussion. If this can have happened in England, under conditions best suited to secure economical management, how far greater is the danger for India, where all ordinary restraints are removed by the grant of an absolute guarantee of interest, which is now well known to be, in fact, subject to no limitation whatever. I regard this danger with great concern, both in relation to the prospects of existing lines, and our hopes of extending them. If the Government is to avoid it, some means must be found for putting an effectual stop to the insidious growth of the capital of the old lines.

26. Nothing is further from my intention than to impute blame to the authorities under whom what I have above noticed has been brought about. I am myself one of them, and there is no question that what has been done in these matters has been done with the best motives, and with every desire to accomplish the best results. But under the system now in force it is impossible that the really essential considerations which affect railway extension can be weighed in the only manner in which success can be secured. To attain this, what seems to be required is, *first*, a careful annual review of the whole subject, and, *second*, the exercise of a more complete control over railway financial arrangements by the Executive Government in India.

27. I am fully impressed with the propriety, and even the necessity, of placing in the hands of the Secretary of State for India the most complete control over the administration of India in all its branches, and I hope that nothing that I am now saying will be considered as implying a desire to weaken that control. But the power exercised in England over affairs actually conducted in India should surely be essentially one of control, and the initiation and practical direction of measures should, as far as possible, remain in the hands of the Indian Government. I cannot think that it is conducive to good administration to remove from the cognisance of the local authorities, for the purpose of placing in the hands of the Secretary of State, the principal management of transactions which already involve an outlay of 100 millions sterling, and must probably extend to double that sum, and which are entirely carried out for India, and at the charge of the Indian revenues. I must ask permission to state my opinion in plain language on this very important point,—to the effect, that the true interests of India demand that the Secretary of State's direct action in relation to Indian railways should be exercised only so far as is essential for the prompt dispatch of that part of the business connected with them which is necessarily carried out in England; and that, beyond this, his intervention should, as a rule, be limited to the control of the Indian authorities, on whom should be placed the same complete responsibility for railway management, both in respect to administration and finance, as is placed on them in all other branches of public business. I feel in the strongest manner that real success in the economical and efficient management and extension of railways in India can only be attained by the frank adoption of this policy.

28. I will next proceed to consider what is the probable sum that could be appropriated from the Indian revenues to promote railway construction in the future, and what would be the corresponding practical results in the shape of new lines constructed, which we might fairly look for under a satisfactory system of administration. Looking back to the actual expenditure of the last eight years, I find that in 1861-62 and 1862-63 the aggregate charge on the revenues of India on account of railways was a little in excess of

two

two millions sterling, of which about 1½ millions was for guaranteed interest, and the rest for loss by exchange, land, and Government supervision. In the present year and last year, the corrected estimates show a total of about 1¾ millions, of which about 1¼ millions was for interest. Considering that there has been an important growth of the revenue in the interval between 1861 and the present time, I think that it would be quite reasonable and practicable to assign two millions as the yearly sum to be appropriated to aid railway extension, and it might, perhaps, be possible to increase this amount somewhat if the growth of the revenues continues. It will, however, be the best plan to reckon two millions as the available sum, and it will be easy to modify the conclusions based on this hypothesis, so as to suit any other sum, either somewhat larger or somewhat smaller.

29. Reviewing the actual results of railway construction up to the present time, I find as follows:—

The total capital expended to the end of 1868 was about 78 millions.

In the first five years, including 1854, the aggregate outlay was 3¼ millions, and since then the average has been, say, five millions yearly.

Of the above sums, about two-fifths have been spent in England, and three-fifths in India.

The average number of miles opened to the end of 1860 was 120 yearly, omitting the first four years, in which nothing was opened; since that time, about 400 miles yearly; the total length now open being nearly 4,000 miles. The general average on 15 years is 270 miles yearly.

The aggregate net receipts in 15 years, from 1854 to 1868, may be called 12 millions, and the gross payments on account of guaranteed interest 25½ millions, leaving a net charge of about 13½ millions.

The average estimated cost per mile of railway under guarantee is 17,000*l.*

30. From this the following deductions may be made:—

That an annual outlay of five millions of capital will, on an average, produce yearly 300 miles of railway, of an average cost of 17,000*l.* per mile.

That, with interest at five per cent., the maximum charge on this account, after deducting net profits, will not exceed 1½ millions.

That the average charge for interest on a prolonged period will be about one million.

That the net profits in the 15th year after the first sections of railway are opened, or the 20th year after the commencement of operations, will be about 600*l.* per mile per annum on the whole length then open.

That the growth of the net profits will be fairly represented by taking them at 100*l.* per mile in the first year, 150*l.* in the fifth year, 300*l.* in the tenth year, and 600*l.* in the fifteenth year, reckoning in each case from the year in which the first sections were opened, on the whole length opened in each year.

31. The above figures apply to railways costing on the average 17,000*l.* per mile. If we could reduce the cost, as certainly should be done, to an average of 12,000*l.* per mile, it might be presumed that the interest charges would be reduced to two-thirds of the above; and if 8,000*l.* per mile could be attained, one-half only of the above charge for interest would be required; and, of course, with the same outlay, a corresponding increase of miles of railway opened would be secured.

32. To place this question in a more definite shape, I have had drawn out a Table to show the probable results of proceeding with the intention of constructing 300 miles of new railway a year on a standard of outlay of 12,000*l.* per mile, which would require a yearly outlay of capital averaging 3¾ millions sterling. It has been assumed that the net payment for guaranteed interest on the lines now open, or under construction, amounts at the present time to one million sterling, and that this will be reduced to 250,000*l.* in 10 years, and to 150,000*l.* in 20 years. This is equivalent to taking the capital at 100 millions, and the average rate of net profit at 970*l.* per mile per annum, or 19*l.* per week, at the end of 20 years, which is the present rate of the East Indian line. The interest on the new capital is reckoned at five per cent. on a sum increasing yearly by 3¾ millions. The average net profits of the new lines opened have been taken to begin with 100*l.* per mile, or less than 2*l.* per week in the fifth year, when the first section of the series would be opened, gradually increasing to 600*l.*, or about 12*l.* per week in the 20th year. This rate of net profit is what has been actually realised under circumstances less favourable than those under which the new lines will be brought into operation.

TABLE to show the probable Results of a Yearly Investment of $3\frac{3}{4}$ millions in Railways estimated to cost 12,000*l.* per Mile.

Number of Year.	Net Interest payable on Existing Railways.	New Capital Invested to end of Year.	Yearly Interest at Five per Cent.	Average Net Earnings per Mile for Total Length Open.	Total Net Earnings of all the New Lines Open.	Net Charge for Interest on New Lines.	Total Charge for Old and New Lines.	Miles of New Railway Open.
	£.	£.	£.	£.	£.	£.	£.	*Miles.*
1	1,000,000	3,750,000	187,500	- -	- -	187,500	1,187,500	—
2	925,000	7,500,000	375,000	- -	- -	375,000	1,300,000	—
3	850,000	11,250,000	562,500	- -	- -	562,500	1,412,500	—
4	775,000	15,000,000	750,000	- -	- -	750,000	1,525,000	—
5	700,000	18,750,000	937,500	100	30,000	907,500	1,607,500	300
6	625,000	22,500,000	1,125,000	110	66,000	1,059,000	1,684,000	600
7	550,000	26,250,000	1,312,500	120	108,000	1,204,500	1,754,500	900
8	475,000	30,000,000	1,500,000	130	156,000	1,344,000	1,819,000	1,200
9	400,000	33,750,000	1,687,500	150	225,000	1,462,500	1,862,500	1,500
10	325,000	37,500,000	1,875,000	175	315,000	1,560,000	1,885,000	1,800
11	250,000	41,250,000	2,062,500	200	420,000	1,642,500	1,892,500	2,100
12	240,000	45,000,000	2,250,000	225	540,000	1,710,000	1,950,000	2,400
13	230,000	48,750,000	2,437,500	250	675,000	1,762,500	1,992,500	2,700
14	220,000	52,500,000	2,625,000	300	900,000	1,725,000	1,945,000	3,000
15	210,000	56,250,000	2,812,500	350	1,155,000	1,657,500	1,867,500	3,300
16	200,000	60,000,000	3,000,000	400	1,440,000	1,560,000	1,760,000	3,600
17	190,000	63,750,000	3,187,500	450	1,750,000	1,437,500	1,627,500	3,900
18	180,000	67,500,000	3,375,000	500	2,100,000	1,275,000	1,455,000	4,200
19	170,000	71,250,000	3,562,500	550	2,475,000	1,087,500	1,257,500	4,500
20	160,000	75,000,000	3,750,000	600	2,880,000	870,000	1,030,000	4,800

33. In the above calculation the net receipts of the new lines have been purposely somewhat under-estimated in the earlier years. The old lines were opened under far less favourable conditions for the rapid expansion of the traffic, and it is quite safe to consider that we here have an outside estimate of the charge which the revenues would have to bear under such an arrangement as is supposed. This maximum, it will be seen, just falls short of two millions, including the charge for the old lines, so that it does not differ in an important degree from the maximum charge in past years, if we include the loss by exchange on the capital, which will not henceforth have to be paid by the Government. A total grant from the revenues of two millions a year would hence, in all probability, more than cover the actual contribution needed. The actual average net profits per mile in 1866, which was the 13th year from the opening of the first lines, amounted to a little more than 600*l.* per annum, or say 12*l.* per week per mile. In the above figures, in the corresponding year, the net profit on the new lines is taken at 500*l.* per annum, or say 10*l.* per week per mile.

34. As these calculations, and indeed all anticipations as to the future of railways in India, essentially depend on the probable income of the lines, it will be convenient if I here show what is the actual position of our Indian railways compared to that of railways in other parts of the world, where they have been longer in operation, or where they have been constructed in countries in a more advanced state of civilisation:—

	Gross Receipts per Week per Mile.		Gross Receipts per Week per Mile.
	£.		£.
Average of 27 lines, England - -	64	Average of 4 lines, South America -	18
„ 5 „ Scotland - -	26	„ 1 line, Mauritius - -	31
„ 9 „ Wales - - -	33	„ 2 lines, Australia - -	39
„ 17 „ Ireland - -	17	„ 9 „ India - - -	26
„ 6 „ France - -	56	Best line in India - - - -	37
„ 4 „ Belgium - -	59	„ in England (excluding Metropolitan lines) - - - - -	138
„ 2 „ Spain - - -	26	Best line having terminus at London (excluding Metropolitan lines) -	88
„ 1 line, Norway - -	30	Best line in France - - -	85
„ 2 lines, Austria - -	70	„ in Belgium - - - -	103
„ 2 „ Italy - - -	21		
„ 3 „ Canada - -	34		

It may be estimated on the average of all the lines that the net profits are about one-half of the gross receipts. The rates which have been taken in the table, in para. 32, will be equivalent to assuming that 20 years hence the average gross receipts of all the Indian lines then open will be 30*l.* per week per mile, which is only an advance of 4*l.* per week on the actual rate. This is so moderate an estimate, that I think it will be generally conceded that the liabilities have not been understated in these calculations, and that we may fairly anticipate a better result in fact.

35. It

35. It would hence appear that if the cost of railways can be kept down so as not to exceed on an average 12,000 *l.* per mile, an average total annual charge on the revenues for 20 years, at a rate probably not exceeding 1½ millions, will secure an addition of 300 miles of railway every year. In other words, that a charge on the revenues of about 5,000 *l.* yearly will be required for each mile of railway, taking a rate of net profits below which it is not likely that the actual results can fall. Further, it appears that this extension of our railways may be accomplished without extraordinary or additional strain on the finances; and if the works are carried out by the direct agency of the State, it is far from impossible that a considerably better result could be obtained. I infer, therefore, that it is nothing more than strictly prudent to make our arrangements at once for an extension of 5,000 or 6,000 miles of railway, the construction of which should be spread over the next 15 or 20 years.

36. After a good deal of careful consideration, I am led to the conclusion that the additions now to be made to the existing system of Indian railways should, in their general design, be laid out on principles not greatly different from those according to which the first scheme of lines framed by Lord Dalhousie. I mean, that, considering the great extent of country which still receives no benefit from railways, our first aim should be to fill in a secondary series of subsidiary main lines, always basing them on the old lines, and laying them out with careful attention to the importance of making them form a consistent whole, on which hereafter further minor branch and cross-connecting lines may be engrafted. It is probable that persons having local interests may advocate the early prosecution of lines of merely local advantage, and that efforts will be made to divert the means at our disposal from the creation of new lines to increasing the conveniences of the old lines, and such a policy may be supported under colour of the probable financial advantage to be obtained by extending and improving existing railways, and supplementing them by branches. But I earnestly hope that this question may be viewed in a really broad and impartial manner, and that the great paramount interests of British India, as a whole, may not be sacrificed to any other less weighty considerations. I feel assured that the course which is really the most conducive to the progress of the country as a whole, will also be the best financially, and that, if the task of extending Indian railways is taken up and dealt with steadily and with earnestness, there is every prospect of the present generation witnessing the completion of such a network of railways as shall very fairly provide for all the main wants of every important part of British India without serious strain on the finances. On the other hand, if we are influenced by personal or merely local interests, or by exaggerated ideas of convenience and refinement, and aim at high speed, or otherwise are led astray by considerations not really applicable to a country like India, we shall find that the progress we desire is not secured, and that the financial prospects of our lines become worse and worse the longer we go on.

37. Holding these opinions, it appears to me that the proper course to follow in preparing for a gradual and systematic extension of railways in India, is first to ascertain what are the new lines most likely to be generally advantageous to the country as a whole in its present condition; and having sketched them out, on a plan which shall secure their providing in the best way possible for the principal cross lines of communication, to undertake their execution methodically, and with a view to the earliest possible completion of continuous extensions of the lines already open. It will not, I think, be possible to determine in a satisfactory way what lines we should first take up, until we have such a general conception of the approximate magnitude of the whole operation we desire to complete, and of the various claims which the requirements of the several parts of the empire have for our consideration.

38. I need not discuss in any detail the specific proposals of the local governments in reply to the call made upon them. To do so would extend this paper to an inconvenient length. I shall, therefore confine myself to the briefest possible statement of the conclusions to which I have come as to the apparent wants of the several provinces viewed in the broad manner that I have described, after giving my best attention to the whole of the facts bearing on the subject in hand. It should be clearly understood that in doing this I shall not now attempt to make any precise estimate of the relative urgency of the lines mentioned. My first object is to obtain as complete a view as possible of the eventual wants of India as a whole, and having done this, the question of the order of execution may properly be touched upon.

39. *Sindh.*—The completion of the communication between Kurrachee and Mooltan, with a line on the other side of the Indus to that occupied by the main line, form one system of lines that seems desirable. A junction with the Bombay lines, from Kotree *viâ* Luckput through Cutch, and thence to Ahmedabad, must also be contemplated.

Punjab.—The line from Lahore to Peshawur, with the main trunk railway from Mooltan to Delhi, and a few branches perhaps to Puttialla, and to Kalka for the large military stations in the hills in that quarter, seem to complete all that is necessary for this province.

North Western Provinces and Oudh.—The lines which seem likely to be most required are the following:—The main line of the East Indian Railway already constructed from Buxar to Delhi, with the branch to Agra, and its continuation to Saharunpoor; the Oudh

Appendix, No. 2.

and Rohilkhund system, as already settled, taking up the country between the Ganges and Gogra, with cross communications to Benares, between Lucknow and Cawnpoor, between Rohilkhund and Allygurh, between Moradabad and the Kumaon hills, and with an extension to Saharunpoor. Of new lines, a branch from Allygurh to Muttra, and another to Furruckabad, would seem to do all that is needed for the Gangetic Doab.

Rajpootana, Central India, and Bundelkhund.—The main line of communication between Upper India and Bombay should, I think, be taken from Delhi by Rewaree to Jaipoor, Ajmeer, Neemuch, Rutlam, and Indore, communicating with the Great Indian Peninsula line on the Nerbudda. A cross line from Neemuch to Baroda will also be desirable, and a bifurcation at the upper end of the line from the vicinity of Ulwa to Bhurtpoor and Agra. A line from Agra to Gwalior and on to Jhansee, and thence through Banda, and so joining the Jubbulpoor line opposite Kallinjur, may also be contemplated. Also a line from Indore by Bhopal to Saugor, and a junction between Jhansee, Saugor, and the Great Indian Peninsula Railway, on the Nerbudda below Jubbulpoor. The Jubbulpoor line and the Nerbudda section of the Great Indian Peninsula line closes in this part of the series.

Bengal.—For North Western Bengal, we already have the East Indian line, with the new chord line. This should be supplemented by a main line extending through the districts north of the Ganges, probably from Colgong by Tirhoot into Goruckpoor, and so joining the Oudh lines, with suitable cross communications. For Northern Bengal an extension of the Eastern Bengal line by Malda and Dinagepoor to the foot of the hills below Darjeeling seems called for. Extensions of the same line to Dacca, and thence to Chittagong, to Mymensing, and eventually, perhaps, to Sylhet, and along the Brahmapootra into Assam should be contemplated. Branches to Furreedpoor, Moorshedabad, and Jessore may also be included.

East Coast of Peninsula.—An important line will be that through Midnapoor and Balasore to Cuttack, and thence along the coast to join the Madras Railway.

Madras.—The completion of the existing main lines of the Madras Railway, with the coast line last noticed, will open out the northern part of this Presidency. For the south, a coast line serving Pondicherry, and communicating with the rich district of Tanjore, and thence with Madura and Tinnevelly, will be needed.

West Coast of Peninsula.—The opening of a line from Beypoor, southwards to Cochin and Trivandrum, with a junction with the Tinnevelly line, suggests itself. Also an extension northwards by Calicut to Cannanore, Mangalore, and Carwar, and thence *viâ* Goa to Bombay.

Mysore.—A line might be carried from Bangalore towards Hassan, and thence on to join the Bellary and Dharwar line.

Hyderabad and the Deccan.—The line from Koolburga to Hyderabad will be one of those to receive early attention. From Hyderabad to Bezwarrah, on the east coast line, and to Nagpoor, lines may also be contemplated. The junction between the two branches of the Great Indian Peninsula Railway from Munmar *viâ* Ahmednuggur, to Dhoond, has already been discussed. A line from Patus, on the Great Indian Peninsula Railway, to Kolapoor, Belgaum, and Dharwar, and thence communicating with Bellary to the east, and with Carwar to the south, would be needed to complete the network in these districts.

Central Provinces.—The Nagpoor and Jubbulpoor branches of the Great Indian Peninsula Railway already provide for the chief wants of this territory. A line, however, should be contemplated going to the eastward to Raipoor, and thence, perhaps, having a continuation down the Mahanuddy to Cuttack and the East Coast Railway.

Bombay.—The existing railways, with those that have already been mentioned in connection with the Deccan and the west coast, nearly complete all that seem called for. Some provision, however, should be made for adding a few branches to the lines now open, and for extending railways into Western Guzerat and Kattywar, and connecting them with the Bombay and Baroda line, as well as giving direct railway communication from the interior to the chief local ports.

Burmah.—A main line along the Irrawaddy, from Rangoon to Prome, should be added to the above list.

40. At first this enumeration of the lines of railway which I think desirable for British India so soon as the means of constructing them shall be available, may seem to be leading us astray from a serious and practical way of viewing the question of railway extension. But I think that, on more careful consideration, such an impression will be seen to be without foundation. The aggregate length of the whole of the lines which I have included in the above review hardly exceeds 15,000 miles, including the lines constructed, or already dermined on and partly begun, which together may be 5,000 miles. Therefore we arrive at the conclusion, which I think must strike every one as eminently satisfactory, that, including all possible main or secondary lines that can be desired (for, I may almost say that I have included all such lines), there only remain 10,000 miles to execute, or double what has already been accomplished. At the rate which experience shows to be quite within our command, 300 miles a year, it would hardly take more than 30 years to complete the whole series. Considering the usual difficulties which necessarily beset the introduction

of

of railway construction in India, and the constantly increased conveniences for the dispatch of materials and rolling-stock, which the continued extension of the lines will give, it seems reasonable to expect that progress in the future may, under any circumstances, be more rapid than it has been till now. If, by improved management, greater economy is secured, and the resources of the State applicable to railway construction are fostered in the manner that I have suggested, it seems to me quite reasonable to hope that such a system of railways as I have just sketched out, may be in actual operation before the expiry of 20 years from the present time. To effect such a result is surely of the very highest importance, not only to India, but to England also; and to secure its realisation is an object worthy of the most earnest attention of the rulers of this country.

41. A few words may be said as to the order in which the actual execution of such lines of railway may best be set about. I have annexed to this Minute a tabular statement showing approximately the manner in which I should suggest that the work should be taken up. Of course this can only serve to indicate the general conclusions which at present commend themselves to me, and it is not put forward with the intention of claiming for it any special value. It will be readily understood that what I regard as essential is, that some specific pre-arranged general plan of operations shall be fairly and consistently acted upon; it is of altogether secondary importance whether or not the particular plan which I think best be adopted. Of course the immediate practical results of what I propose would be the definite commencement of a certain moderate length of railway; and when the time came for further extensions, the whole subject would be liable to re-consideration, and it may be that cause would be found for revising former opinions. What I deprecate is further desultory and, so to speak, aimless action. What I desire is steady and persevering progress towards the completion of a definite scheme for giving railways to all parts of India.

42. There is only one other point to which I wish to refer. If there is one thing which comes out in more prominent relief than another in connection with railway construction in all parts of the world, it is this, that those lines are financially successful in which the capital accounts are kept down to a low amount, and those are unsuccessful in which this has not been accomplished. The lesson we should learn from this is, that the character of the line, and the amount of expenditure upon it, should be regulated as far as possible by a proper consideration of the probable returns, and not more than is essential by any preconceived ideas of what is the best standard form of railway to adopt. I regard it as the extreme of infatuation to lay down any absolute rules to regulate the modes of construction of railways in a country so vast, so various in its natural features, and so poor as India. Still more mistaken is it to apply to India rules essentially based on the wants of England, which is probably the country in the world from which India most widely differs. England, of all others the richest, the most populous, the most celebrated for its manufactures, the most addicted to commerce, an island of small size, in a highly advanced state of civilisation, where dispatch is of extreme importance, and time equivalent to money, England, of all countries, is the last which we should take as our model in these things. In one respect certainly, but only in one, can I admit that English Standards are applicable—let all workmanship be thoroughly good of its kind, and every part of the construction permanent and suited to what is required of it.

43. Skill in engineering work implies the successful adaptation of the art of construction to varying circumstances. For a poor country, economy is one of the essential conditions to be complied with, and its requirements may be as rigid as any of those imposed by physical conditions. Wholly to reject railways for a country which is not able to support lines of the most costly description, is quite unreasonable; and if, on a further examination in detail of the probable cost and returns of any of the lines which otherwise seem desirable, the expense of lines of the ordinary gauge seems prohibitory, while lines of a narrow gauge would be financially practicable, I should consider it a most mistaken view to reject the narrow gauge line. And so with any other modification of ordinary practice. For complete success in the great operations which the Government of India has before it, broad views and a ready adoption of all truly sound measures, whether out of the usual course or not, are essential, and it will be a source of lasting regret if the progress of this country, which, of all others, most directly depends on the improvement of its means of internal communication, should be retarded by the weight of administrative prescription, or engineering prejudice.

(signed) *John Lawrence.*

Calcutta, 9 January 1869.

Appendix, No. 3.

PAPERS put in by Lord *George Hamilton*.

Appendix, No. 3.

(No. 377 A.—G.)

Government of India.—Public Works Department.—Account.—General.

SIMLA, 18 JULY 1873.

FORECAST of EXPENDITURE from LOAN FUNDS on RAILWAYS and IRRIGATION WORKS.

READ,

Memoranda Nos. I., II. and III., with accompanying tables prepared in the Public Works Department Office, on Forecasts of Expenditure on, and Returns from, the Railway and Irrigation Works now in hand and previously constructed, embracing both Guaranteed and Loan Works.

OBSERVATIONS.—The expenditure upon Railways and Irrigation Works, as well as the liabilities which have already been incurred, or are likely to be incurred, by the State for the construction of such works, have now and will continue to have an important bearing upon the finances of India.

2. The Governor General in Council, being desirous, so far as the nature of the case admits, of forming an estimate of the results of the expenditure which has been incurred or is contemplated upon such works (whether from capital raised through the agency of guaranteed companies, or supplied directly by the State from loans or surplus revenue), directed calculations to be made for the purpose of ascertaining the probable results,—

1st. Of the expenditure already incurred upon Guaranteed Railways and upon Irrigation Works;

2ndly. Of the completion of the Guaranteed Railroads; and

3rdly. Of an annual expenditure of about three millions sterling upon State Railways, and one and a half millions upon Irrigation Works during the next five years.

3. These calculations are contained in the memoranda and tables now under consideration. They have not been compiled for the purpose of showing the profit or loss upon any particular work, but solely with a view to give the best available materials for forming an opinion whether or no the expenditure already incurred, coupled with that which is contemplated during the next five years, will produce an increased annual charge upon the general revenues.

4. The manner in which the calculations have been made reflects credit upon the officers of the Public Works Department. The estimates of the cost of construction are not in all cases complete, and it is to be expected that some of the original estimates will be exceeded. The precaution has, therefore, been taken of allowing in the forecast larger sums for the probable cost of the works than are shown either in the detailed or rough estimates for the works. The estimates of income have been taken at very moderate amounts; new works are not calculated to produce any considerable return during the period embraced by the forecast; the traffic on the guaranteed railways is expected to give a moderate increase of net revenue, and this expectation does not appear unreasonable, as several hundred miles of new lines will be opened for traffic, and thus a considerable amount of guaranteed capital which has hitherto been employed upon construction will begin to give a return.

5. It is assumed in the calculations that the funds required for State works during the five years included in the forecasts will be borrowed at the rate of 4 per cent. Interest on the whole capital expenditure is a part of the actual cost of such works, even though the money be not borrowed but provided from surplus revenues; for were the surplus not so appropriated, debt and the charge upon the revenues for interest might be reduced. At the same time, for the purpose of this estimate, it is to be borne in mind that, so far as the expenditure upon these works is provided for (as in the present year) from the revenues without further borrowing, their construction will not cause any addition to the amount of interest now paid from the public revenue.

6. Although the estimates have been framed with great caution, there exist so many disturbing causes which may affect them that the results have been put forward with considerable reserve, and can only be so accepted by the Government.

7. It is, however, satisfactory to know that, so far as reliance can be placed upon the most carefully prepared estimates, no additional annual charge upon the revenues is likely to result from the past and contemplated expenditure upon railroads and irrigation works; and his Excellency in Council considers that the scale of annual expenditure for the next five years upon which these calculations are based, may, subject to the confirmation of Her Majesty's Government, be accepted as a guide for future operations; and that, in the course of the next five years, an addition of 2,700 miles of railway, and irrigation works calculated to secure from liability to drought 50,000 square miles of country, will probably be provided without any financial difficulty.

8. The works specified in the lists appended to the Memoranda have been selected as being those most likely to be commenced within the period embraced in the forecast; but their insertion in the lists does not imply that they have received the sanction of Government. The sanction of any particular work will depend upon the consideration of estimates

and

and plans which, in respect to some of the works included in the lists, have not yet been elaborated, and upon the approval of Her Majesty's Government.

9. The margin of annual expenditure which is left unappropriated to works already sanctioned and commenced will permit of the rate of annual expenditure being contracted, if a reduction should be found necessary."

ORDER.—Ordered, that the Secretary of State be addressed accordingly.

Ordered, also, that this Resolution, with the papers now read, be published in the "Gazette of India" for general information.

C. H. Dickens, Colonel, R.A.,
Secretary to the Government of India.

MEMORANDUM No. I.

On the FORECASTS of GUARANTEED and LOAN WORKS EXPENDITURE and INCOME from 1872-73 to 1877-78, including RAILWAYS and IRRIGATION WORKS.

THE probable effect on the finances of the operations on Loan Works is considered in detail in the Memoranda Nos. II. and III., and the results only will be brought together in this Memorandum.

IRRIGATION WORKS.

2. The works in hand and in contemplation are given in the list accompanying Memorandum No. II., by which the total expenditure required is estimated at 20,325,000 *l.* Of this sum 4,589,000 *l.* has already been spent, and during the next six years, including 1872-73, the outlay will be about 8,489,000 *l.*; of this last amount 625,000 *l.* will be paid by the Puttialla and other Sikh states, and the balance of 7,864,000 *l.* must be raised by loan, or paid from surplus of ordinary revenue over expenditure.

3. The increased charge for interest, supposing the whole of the funds to be borrowed, is shown in the first column of the following table, the estimated increase of net revenue in the second column, and in the third column the net increase of annual charge, by deducting the increased net revenue from the charge for interest:—

YEAR.	Interest Charge at 4 per Cent.	Increased Net Revenue.	Increase of Annual Charge.
	£.	£.	£.
1872-73 - - - -	38,760	- -	38,760
1873-74 - - - -	89,400	20,000	69,400
1874-75 - - - -	148 400	40,000	108,400
1875-76 - - - -	206 360	60,000	146,360
1876-77 - - - -	262,400	80,000	182,400
1877-78 - - - -	314,560	100,000	214,560

4. The calculation has not been carried beyond 1877-78; but as regards the works included in the forecast, after this the outlay will fall off, and the income of the new works will come in to lessen and ultimately remove the burden.

RAILWAYS.

5. The projects for State railways actually in hand or under contemplation, are shown in Statement No. 2 accompanying Memorandum No. III., which contemplates from 1874-75 an outlay of three millions sterling annually.

6. Deducting the income expected from State lines, according to the lowest calculations made, from the charge for interest, the annual burden on the finances will be as follows:—

YEAR.	Miles of New Railway Open.	Interest Charge at 4 per Cent.	Net Earnings.	Increase of Annual Charge.
		£.	£.	£.
1872-73 - - -	- -	129,780	- -	129,780
1873-74 - - -	150	235,679	13,700	221,979
1874-75 - - -	775	357,880	77,500	280,380
1875-76 - - -	1,335	478,280	200,250	278,030
1876 77 - - -	1,810	598,280	280,550	317,730
1877-78 - - -	2,125	718,280	340,000	378,280

7. The expenditure up to the end of 1877-78 is calculated to complete 2,700 miles for working in 1878-79.

8. But there is another consideration to be brought to bear—this is, the profits to be expected from the guaranteed lines. In respect to this, we are in a rather uncertain position. The earnings of the railways, after increasing up to the year 1870, have gone

Appendix, No. 3.

back owing to a decline of traffic. The earnings of the calendar year 1872 show a recovery, but in consequence of the time at which it took place, the results of this revival appear in the financial year 1871–72, while in the financial year 1872–73 the decline is mainly due to large adjustments between capital and revenue. These will not occur again, and the final effect of the adjustments is, on the whole, favourable to the State; but they appear for the financial year 1872–73 as a serious increase of burden. The consideration of the probable net returns from the guaranteed lines, for the years embraced in the forecast, is fully discussed in the accompanying Memorandum, No. III.

9. The estimated net annual charge for interest on account of guaranteed railways is given in the first column of the following table; this result, added to the net annual charge for the State lines, gives the entire net annual burden to the State on account of railways:—

Year.	Net Annual Charge on Account of Railways.		
	Guaranteed.	State.	Total.
	£.	£.	£.
1872–73 - - - -	2,209,600	129,780	2,339,380
1873–74 - - - -	1,836,200	221,979	2,058,179
1874–75 - - - -	1,631,000	280,380	1,911,380
1875–76 - - - -	1,567,250	278,030	1,845,280
1876–77 - - - -	1,487,250	317,730	1,804,980
1877–78 - - - -	1,397,250	378,280	1,775,530

10. Finally in the following table, the estimated net annual charge for irrigation works is added to the aggregate estimate of the net annual charge for railways:—

Year.	Net Annual Charge on Account of		
	Railways.	Irrigation.	Total.
	£.	£.	£.
1872–73 - - - -	2,339,380	38,760	2,378,140
1873–74 - - -	2,058,179	69,400	2,127,579
1874–75 - - - -	1,911,380	108,400	2,019,780
1875–76 - - - -	1,845,280	146,360	1,991,640
1876–77 - - - -	1,804,980	182,400	1,987,380
1877–78 - - - -	1,775,530	214,560	1,990,090

11. It will be seen that taking guaranteed and loan works together, and supposing these estimates to be fairly reasonable, the operations contemplated by Government are not likely, on the whole, to involve any increased annual charge upon the State.

12. But the net return of the guaranteed railway traffic is a seriously disturbing element in the calculations, and it is therefore only with much diffidence that any estimate can be made.

13. It may be useful, however, to show briefly by another mode of calculation how far this element of uncertainty affects the forecast.

14. The gross estimated expenditure for the five years from 1873–74 to 1877–78 (both inclusive) is shown from the tables to be as follows:—

		£.
Upon guaranteed railways - - - - - - - -		4,950,000
„ State railways at 4 per cent. - - -	£. 13,808,000	
„ „ „ at 4½ „ - - -	804,000	
		14,612,000
„ Irrigation works - - - - - - - - -		7,410,000
Total - - £.		26,972,000

15. For the purpose of calculating the increased charge for interest in the year 1877–78, as compared with the year 1872–73, these figures require modification on two points—

1st. On the 31st March 1873 the balance of guaranteed railway funds already raised and in the hands of the State is estimated to have been 2,741,000 *l.*, upon which sum interest was paid in the year 1872–73; deducting that sum from the estimated expenditure upon guaranteed railways of 4,950,000 *l.*, there remains to be raised by means of the guaranteed companies the sum of 2,209,000 *l.*

2nd. From the total estimated expenditure upon irrigation works of 7,410,000 *l.*, there should be deducted the sum of 515,000 *l.* which will be contributed by the Sikh rajahs, leaving a balance of 6,895,000 *l.*

16. Making these necessary modifications, the following will be the calculation of the increased charge for interest in 1877–78, as compared with 1872–73, assuming that all the money is provided by loan and provided at the commencement of the year in which it is required,

required, and that the rate of interest for the money raised by the guaranteed railway companies and for the Holkar State Railway will be 4½ per cent., and for that raised by the Government of India 4 per cent.:—

Guaranteed railway expenditure—

			£.
£. 2,209,000 at 4½ per cent.			99,405
State works—			
Railway	£. 13,808,000		
Irrigation	6,895,000		
Total £.	20,703,000 at 4 per cent.	£. 828,120	
Add Holkar Railway	804,000 at 4½ „	36,180	
			864,300
		Total £.	963,705

17. In order to meet this increase of charge, it is estimated that there will be the following receipts:—

	£.
1st. Increased returns from existing works of irrigation	100,000
2nd. Net traffic returns from State railways, 2,125 miles at 160 *l.* a mile.	340,000
3rd. Net traffic returns on 900 additional miles of guaranteed railways, at 200 *l.* a mile.	180,000
	620,000
Leaving £.	343,705

to be provided by the growth of traffic on existing lines, in order to meet the increased charge for interest.

18. The above brief calculation, however, only shows the result it would be necessary to arrive at in order to keep up an equilibrium with the present state of the railway and irrigation finances. The Forecast Tables go further, and show an improvement, inasmuch as there is a reduction of net charge from 2,378,140 *l.* in 1872-73 to 1,990,090 *l.* in 1877-78, being a difference of 388,050 *l.* This is wholly due to the estimate of guaranteed railway traffic. The estimated increase within the period embraced in the forecast is 1,000,000 *l.*, together with a saving of 59,850 *l.* in the Government expenditure on land and supervision, which will diminish as the lines are completed. On the other hand, no advantage has been taken of the fact that a sum of 2,741,000 *l.* is already in hand, and interest already being paid thereon (137,050 *l.*), nor of the probability of future capital being raised at 4½ instead of 5 per cent. (11,045 *l.*).

Thus we have—

		£.
Increase of net earnings in forecast		1,000,000
Saving in land, &c.		59,850
		1,059,850
Interest on 2,741,000 *l.*	£. 137,050	
Difference ½ per cent. interest	11,045	
		148,095
		911,755
Deduct—Improvement in financial condition		388,050
Balance of net earnings as shown in paragraph 17	£.	523,705

of which 180,000 *l.* was set down to 900 miles of new line, and 343,705 *l.* as the minimum of growth of traffic on previously existing guaranteed lines required to prevent increase of charge to the State.

19. The estimate made of the net traffic receipts for guaranteed railways for 1877-78 in the Forecast is 3,470,000 *l.*; by that time it is calculated that there will be 6,070 miles of rail open, so that the net receipts per mile open have been calculated at 572 *l.*

20. It will be seen from the figures given in the explanation of the estimates of net traffic receipts of guaranteed railways for 1872-73 and 1873-74, appended to Memorandum No. III., that the net receipts per mile of railway open were—

	£.
In 1868	653
1869	618
1870	593
1871	533
1872	550

21. The calculation adopted in the Forecast puts the net traffic receipts per mile at a less figure than the actual results for either of the three favourable years, 1868 to 1870, but somewhat higher than those of the two unfavourable years, 1871 and 1872. Even if the figures of the last year or of the most unfavourable year (550 *l.* or 533 *l.* instead of 572 *l.*)

Appendix, No. 3.

were taken, still the general conclusion would not be affected, as the net annual charge would not exceed that estimated for the current year. And, further, if we are contented with the calculation of paragraph 17, the net receipts would come to 493 *l.*; traffic receipts at which low figure would be sufficient to prevent any increase of charge to the State.

MEMORANDUM No. II.

On the Forecast of Irrigation Charges.

On the whole, it is believed that we are getting such a return from past expenditure on irrigation works, that they have thrown no burden on the finances; but until the returns are completed the result cannot be told certainly.

2. The following gives the best information available:—

	Capital Account to end of 1871-72.	Interest at 4 per cent.	Net Income as per Latest Information.
	£.	£.	£.
Madras (for 30 works only)	(*c*) 1,307,000	52,280	367,000
Bombay, excluding Sindh	(*c*) 798,000	31,920	1,500
Bengal	2,163,000	86,520	—22,500
North Western Provinces	3,331,000	133,240	(*a*) 166,000
Punjab	2,260,000	90,400	(*b*) 188,000
Sindh	(*c*) 800,000	32,000	190,000
TOTAL £.	10,659,000	426,360	890,000

(*a*) Includes increase of land revenue due to the canals, of 44,000 *l.*
(*b*) Ditto ditto 98,000 *l.*
(*c*) (*c*) (*c*).—Amounts not known. These are approximate sums.

3. Besides these works we have the project of the Madras Irrigation Company. This company has a guaranteed capital of one million sterling at 5 per cent., and a loan of State funds of between 500,000 *l.* and 600,000 *l.* The works have not yet begun to yield any net returns.

4. The present burden on the finances on account of this company is, therefore, here taken at 50,000 *l.* per annum, which is to be added to the 426,360 *l.* in the foregoing table. This makes the total charge for interest 476,360 *l.*, while the estimated net income is, as above, 890,000 *l.* As far as existing information goes, therefore, the net result of the entire outlay on irrigation works up to the year 1872–73 is a return of 413,640 *l.* per annum above the interest at 4 per cent. per annum on the first cost of the works.

5. The works now in hand and contemplated are given in the accompanying table. The rate of expenditure set down is that which is calculated on the whole to be the most advantageous, considering the establishments available and the probable rate of growth of the irrigation.

6. Some of these works, as those at the Godavery and Kistna, are extensions of projects previously carried out with great success. These will, doubtless, pay well. The Bombay projects are more experimental. There are in that Presidency no large works in full operation. The capital outlay, however, is comparatively small, and the extension of the projects will be limited until experience has proved that they will pay. In Sindh the works are for the most part what are called inundation canals. They come into operation only where the Indus is in flood, and afford means of cultivation in localities where there is practically no rain. These works are always found to pay well when their extension is kept within the limits of the possible spread of cultivation.

7. In the Lieutenant Governorship of Bengal there are two great projects; neither is in the Province of Bengal proper. The Orissa Scheme was first undertaken by a company, and was purchased by the Government. The famine of 1866 justifies the expenditure of a large sum in order to guard against the recurrence of such a calamity, and though the growth of irrigation will be slow, it is believed that ultimately the canals will at least pay interest on the capital laid out. At present there is no net return. The Soane Works are in the Province of Behar, where the climate more resembles that of the North Western Provinces, in which canal irrigation has been practised with success. Some of the canals will be ready to receive water and commence irrigating next year.

8. In the North Western Provinces the Ganges Canal has paid interest on the average of the last five years at 5 per cent. Some original defects of construction still require to be remedied, and the completion of the network of distributing channels is in hand. The Agra Canal is a new work, the head of which is formed by a weir across the Jumna a few miles below Delhi. Water will probably be admitted next year, and the nature of the climate is such that there is no doubt that the water will be acceptable. The Lower Ganges Canal is a new project just set in hand; it is to take up the irrigation of the Doab where the original Ganges Canal leaves off. The country is well suited for canal irrigation. The Eastern Ganges Canal, amongst the contemplated projects, is intended to take water from the

the Ganges to irrigate the western part of Rohilkund, which has in former years suffered severely from famine, and where water will be as valuable as on the western side of the Ganges.

9. The works contemplated on the Baree Doab Canal involve the construction of a second head to obtain an additional supply of water, to be followed by remodelling and extensions, as in the case of the Ganges Canal. The water in this tract is most valuable, and there is every hope that this canal will pay well when brought into proper working order. The Sirhind Canal is a new project, with a head on the Sutlej at Roopur. It is intended to water the dry tract between the Jumna and the Sutlej, and though the works will be expensive, there is every prospect of its paying. The Puttialla, Jheend, and Nabha States join the British Government in undertaking this work.

10. The extensions of the Western Jumna Canal also involve improvements. This work is the oldest of the canals in the North West of India. It was originally a Mahomedan work, and was re-opened by the British Government in 1821. Since then it has much more than re-paid, with interest, the entire capital expended on it. The original works, however, were very defective, and in the early days of irrigation the drainage in that dry tract was not much regarded, while the cultivators were allowed to take their distributing channels from the main canal much as they pleased. As the irrigation has developed, the evils of these arrangements have been seriously apparent. Drainage is interfered with, and unwholesome swamps formed. The partial remedies applied from time to time have failed to keep pace with the requirements of the irrigation. It is desirable to extend the irrigation, but this cannot be satisfactorily done unless it be accompanied by a complete revision of the main canal and distribution channels. The income derived from irrigation here is so large that there is no doubt the cost of the works will be fully covered by the returns.

11. No profits have been calculated on from any of the new works within the period embraced in the forecast. It is found by experience that, at a rule, the growth of irrigation from new canals is slow, and in the first few years the canals hardly pay working expenses, if so much. It is safe, therefore, to abstain from reckoning on any returns. Some of the works may give a small profit; others will probably not pay working expenses.

12. The only source of increased income to be reckoned on, therefore, is the growth of the returns from the canals already working. It has been found from experience that returns continue to grow long after the works are apparently in full use. A great deal of the growth of income arises from the economical management of the water, which is due to experience and constant efforts to economise it, so that after a time more acres are irrigated from a given supply of water than at first. But growth also takes place by a larger supply of water being taken up for irrigation. The Western Jumna Canal was opened in 1821, and the Eastern Jumna Canal in 1830. In both the income is still growing; it rises greatly in years of drought, and falls back more or less in years of plentiful and well-timed rain; but on the whole it grows.

13. It is not, of course, possible to give any accurate estimate of the probable total growth of the entire income from the whole of the irrigation works. The local circumstances are different in each case, and the returns depend much on the seasons. It would not be right to neglect the fact of this growth on the one hand or to rely too much upon it on the other. What has been done is to consider the probability of growth under various aspects in reference to the local circumstances in each case, in reference to the general growth of income in past years, in reference to the "duty" to be expected from each cubic foot of water supplied, and so forth. Several calculations have been made from these data, and the lowest of them has been taken. It gives the following result, which the best authorities agree in considering quite safe:—

	£.
Increase of net revenue over that for 1871-72 in 1873-74 - -	20,000
Ditto - - - - ditto - - - 1874-75 - -	40,000
Ditto - - - - ditto - - - 1875-76 - -	60,000
Ditto - - - - ditto - - - 1876-77 - -	80,000
Ditto - - - - ditto - - - 1877-78 - -	100,000

14. The intended capital outlay upon new works is shown in the following table, together with the interest upon it at the rate of 4 per cent., and deducting from the charge for interest the estimated increase of revenue, the result, that is, the net increase of annual charge on account of irrigation works, is shown in the last column:—

	Total Capital Outlay.	Less contributed by Sikh States.	Net Capital Outlay from Imperial Funds.	Interest Charge at 4 per Cent.	Increase of Net Income.	Net Increased Annual Charge.
	£.	£.	£.	£.	£.	£.
1872-73 - - -	1,079,000	110,000	969,000	38,760	- -	38,760
1873-74 - - -	1,356,000	90,000	1,266,000	89,400	20,000	69,400
1874-75 - - -	1,575,000	100,000	1,475,000	148,400	40,000	108,400
1875-76 - - -	1,549,000	100,000	1,449,000	206,360	60,000	146,360
1876-77 - - -	1,501,000	100,000	1,401,000	262,400	80,000	182,400
1877-78 - - -	1,429,000	125,000	1,304,000	314,560	100,000	214,560

IRRIGATION WORKS.

ROUGH FORECAST of MONEY likely to be Required from LOAN FUNDS during Six Years.

PROVINCE.	No.	NAME OF WORK.	Estimated Cost.	Approximate Expenditure to end of March 1872.	1872-73.
		Sanctioned altogether or in part.	£.	£.	£.
Madras	1	Completion of Godavery Delta Works	246,000	81,000	18,000
	2	Ditto - Kistna - ditto	570,000	95,000	11,000
	3	Ditto - Pennair - ditto	55,000	40,500	8,500
	4	Cauvery Delta Improvements	90,000	32,000	13,000
	5	Other Projects	263,000	49,500	27,500
Bombay	6	Moota Project	*500,000	263,000	37,000
	7	Taptee Project	300,000	11,000	8,000
	8	Other Projects	350,000	267,000	25,000
Sindh	9	Various small schemes	131,000	103,000	7,000
	10	Eastern Narra, Jhambrao, and Mitrow Canals.	867,000	246,000	10,000
	11	Desert Canal	†96,000	- - -	- - -
Bengal	12	Orissa Project	2,770,000	1,719,000	203,000
	13	Soane Project	3,775,000	444,000	244,000
North Western Provinces	14	Remodelling Ganges Canal (including new branches) and completing distributaries.	850,000	218,000	37,000
	15	Agra Canal	575,000	313,000	105,000
	16	Lower Ganges Canal	1,699,000	12,000	48,000
Punjab	17	Baree Doab Canal. Extension and improvements, including Lower Baree Doab.	1,100,000	164,000	63,000
	18	Sirhind Canal	2,980,000	410,000	174,000
	19	Western Jumna Canal Extensions	1,170,000	71,000	44,000
Minor Provinces	20	Minor Works	100,000	2,000	*a*—23,000
		TOTAL	18,487,000	4,541,000	1,060,000
		Contemplated.			
Madras	21	Pennair Extension and others	410,000	- - -	- - -
North Western Provinces	22	Eastern Ganges Canal	845,000	21,000	2,000
	23	Other Projects	328,000	15,000	5,000
Punjab	24	Swat River Project	147,000	3,000	5,000
	25	Other Projects (Derajat Canal)	§	9,000	7,000
Central Provinces	26	Ramteak Project	108,000	- - -	- - -
		TOTAL £.	1,838,000	48,000	19,000
		GRAND TOTAL £.	20,325,000	*b* 4,589,000	1,079,000
		Less,—To be contributed by Native States			110,000
		Net Grant from Imperial Funds £.			969,000

* Allowing for continuation of portion beyond Poona, funds for which, if sanctioned, will be provided for from grants for contemplated projects.

† Sanctioned for the present against "Ordinary," but will probably be ultimately charged to "Loan Funds." Grant for 1873-74, 15,000 *l.*

‡ The total contribution required will be 1,062,200 *l.*, but only 625,000 *l.* will be required within the six years.

§ Under survey. Estimates not yet prepared.

- - - - - - - -IRRIGATION WORKS.

- - ROUGH FORECAST of MONEY likely to be required from LOAN FUNDS during Six Years.

PROBABLE EXPENDITURE FOR					Total from 1st April 1872.	Deduct to be Contributed by Native States.	Total Loan Funds required during Six Years.	No.
1873-74.	1874-75.	1875-76.	1876-77.	1877-78.				
£.	£.	£.	£.	£.	£.	£.	£.	
49,000	40,000	40,000	18,000	- -	165,000	- - -	165,000	1
16,000	30,000	30,000	30,000	30,000	147,000	- - -	147,000	2
6,000	- -	- -	- -	- -	14,500	- - -	14,500	3
1,000	10,000	12,000	12,000	10,000	58,000	- - -	58,000	4
19,000	30,000	30,000	30,000	30,000	166,500	- - -	166,500	5
61,000	19,000	- -	- -	- -	117,000	- - -	117,000	6
8,000	50,000	50,000	50,000	50,000	216,000	- - -	216,000	7
28,000	16,000	14,000	- -	- -	83,000	- - -	83,000	8
3,000	6,000	6,000	6,000	- -	28,000	- - -	28,000	9
5,000	20,000	20,000	20,000	20,000	95,000	- - -	95,000	10
- -	20,000	20,000	20,000	10,000	70,000	- - -	70,000	11
167,000	160,000	160,000	160,000	160,000	1,010,000	- - -	1,010,000	12
243,000	250,000	250,000	250,000	250,000	1,487,000	- - -	1,487,000	13
47,000	45,000	45,000	45,000	45,000	264,000	- - -	264,000	14
101,000	56,000	- -	- -	- -	262,000	- - -	262,000	15
135,000	160,000	160,000	160,000	160,000	823,000	- - -	823,000	16
75,000	80,000	80,000	80,000	80,000	458,000	- - -	458,000	17
290,000	256,000	250,000	250,000	250,000	1,470,000	‡625,000	845,000	18
56,000	100,000	100,000	100,000	100,000	500,000	- - -	500,000	19
16,000	25,000	25,000	25,000	30,000	98,000	- - -	98,000	20
1,326,000	1,373,000	1,292,000	1,256,000	1,225,000	7,532,000	625,000	6,907,000	
- -	202,000	257,000	245,000	204,000	957,000	- - -	957,000	21
6,000								22
8,000								23
4,000								24
12,000								25
- -								26
30,000	202,000	257,000	245,000	204,000	957,000	- - -	957,000	
1,356,000	1,575,000	1,549,000	1,501,000	1,429,000	8,489,000	625,000	7,864,000	
90,000	100,000	100,000	100,000	125,000	625,000	—	—	
1,266,000	1,475,000	1,449,000	1,401,000	1,304,000	7,864,000	—	—	

	£.
a Refunded from Ordinary Grant on account of Sardah Canal project - -	34,000
Less the probable expenditure on Minor Works during this year - - -	11,000
Net difference - £.	23,000

b Excludes outlay on works already completed and not included in this scheme.

Note.—Items 3, 6 to 8, 10, 12, 13, 15, and 18 include outlay against capital account from ordinary funds.

Appendix, No. 3.

MEMORANDUM No. III.

On the FORECAST of RAILWAY CHARGES.

THE accompanying forecast of the charges on the revenues on account of railways has been prepared in the following way :—

2. Statement No. I. shows the total capital expenditure on guaranteed railways up to the close of 1871–72, and the estimated expenditure thereafter for each year up to 1877–78. The figures for 1872–73 and 1873–74 are taken from the regular and Budget Estimates of expenditure in India, and from estimates of expenditure in England prepared in the India Office. The rates of exchange fixed in the contracts have been followed in this Statement and in No. III., in converting rupees into sterling. There is not much room for difference of opinion as to the general sufficiency of this forecast. It cannot be absolutely said that one or two millions more than are here estimated could not be properly spent in enlarging the conveniences of, or improving, the existing guaranteed railways, but it may be affirmed that there is no immediate need for any further expenditure than is there set down, nor any near prospect of its being required.

3. Statement No. II. gives similar information in regard to State railways. These figures are based on the best available information as to the probable cost of each railway, and on the assumption that a yearly total expenditure of three millions sterling will be met by the State.

4. In this table all railways belonging to the State are included, except the Patree Salt branch, which may be looked upon as a tramway for the service of the salt works, and has been paid for out of current revenue. First come the open lines, two in number; the Calcutta and South Eastern, which was surrendered by the company that had constructed it, and the Nulhattee branch, which was purchased.

5. The second group consists of sanctioned lines in more or less advanced stages of progress. In this group is included the Holkar (State) Railway, which is made with funds lent for the purpose by the Maharaja to the British Government at 4½ per cent. interest.

6. The third group consists of lines which may probably be undertaken hereafter, and for which projects and estimates have been prepared. The total annual expenditure on all the State lines from the years 1874–75 onwards is taken at 3,000,000 *l.*; but in order to allow of any modification that circumstances may require, or more precise information may show to be necessary, the annual expenditure on the third group of lines (with the exception of the Gwalior Railway, for which Maharaja Scindia has undertaken to contribute a loan at 4 per cent. interest) is only shown in the gross, and not parcelled off between the several lines, as is done in the second group of "sanctioned" lines.

7. The rejection of any one or more of the proposed lines need not, then, affect the total annual expenditure either on the third group or on all the lines taken together, which may be adjusted to the estimated figure of three millions sterling a year from 1874–75 onwards.

8. In Statements III. and IV. we arrive at the effect of the foregoing estimates on the annual revenues of India. Statement III. exhibits the total of the capital expenditure on guaranteed railways as detailed in No. 1, and the interest thereon.

9. It is clear that much of the value of this forecast depends upon the estimate of the net traffic receipts. For the years 1872–73 and 1873–74, the estimates lately submitted are taken; for 1874–75 the increase is taken at 270,000 *l.*; and for subsequent years the annual increase is estimated at 100,000 *l.* A brief explanation of the estimates for 1872–73 and 1873–74, abstracted from the reports already laid before the Government of India, is attached to this Memorandum. It is believed that this estimate is not over-sanguine. A comparatively small development of any new paying traffic on one of the great lines would make the estimate too low.

10. In Statement IV. a similar process is repeated for the State lines, but with a little difference. The Holkar 4½ per cent. loan of one million is shown by itself, and the interest is calculated separately. The Nizam's State Railway is not taken into account at all, as the funds are provided by the Nizam; but all other railways are supposed, for the purposes of this forecast, to be constructed from funds raised by loans bearing interest at 4 per cent. The only head calling for further remark is that of "Net Traffic Receipts." It is quite impossible to foretell, with any accuracy, what these will be on lines of a novel character, which pierce districts where trade does not run in the well-worn channels occupied

occupied by some of the guaranteed lines. All that can be done is to study the results of the guaranteed lines, and such statistics of the new districts as can be obtained, and then to frame an estimate, leaving a wide margin for unknown contingencies. This has been done, and of four different estimates, three of which were prepared on different plans, the lowest has been taken. It is believed that these figures represent a very low estimate of the probable returns of the State railways. For the year 1873–74 the Budget Estimate of net receipts has been taken as a guide.

11. Lastly, Statement No. V. shows the guaranteed and State railway net charges together. The "total" figures in this return show the whole estimated net charge on the revenues, on account of all the railways, on the basis of calculation explained in this Memorandum.

Explanation of Estimates of Net Traffic Receipts of Guaranteed Railways for 1872–73 and 1873–74.

The regular estimate of net traffic receipts of guaranteed railways for 1872-73 is 2,470,000 *l.*, the Budget Estimate having been 2,924,000 *l.*—a decline of 454,000 *l.* Of this sum the Great Indian Peninsula Railway accounts for 315,000 *l.*, the Bombay and Baroda Railway for 41,600 *l.*, and the Eastern Bengal Railway for 88,000 *l.* A great portion of the last two differences is explained by the expenditure in restoring the works injured by floods being met from the Revenue Advance Account. On the Great Indian Peninsula Railway the decrease is partly attributable to a decline of traffic, and partly to the adjustment in the course of year of certain charges between capital and revenue, which throw a large charge on the revenue of the year.

The actual net traffic receipts applied in reduction of the charge for guaranteed interest have been—

	£.
1868–69 - - - - - - - - -	2,230,527
1869–70 - - - - - - - - -	2,628,942
1870–71 - - - - - - - - -	2,556,781
1871–72 - - - - - - - - -	2,868,948
1872–73, Regular Estimate - - - -	2,470,000
1873–74, Budget Estimate - - - -	2,900,000

Before the last figures can be accepted it is necessary to show the decrease in 1872–73 is not due to any general decline of traffic that can be considered permanent. This can best be deduced from the Revenue Accounts, which show the actual earnings and actual expenditure for each calendar year.

Year.	Earnings.	Expenses.	Profits.	Miles Open.	Per-centage of Earnings absorbed in Working.
	£.	£.	£.		
1868 - - -	5,353,209	2,874,503	2,478,706	3,931	53·7
1869 - - -	5,739,382	3,226,878	2,512,504	4,065	56·2
1870 - - -	6,246,591	3,411,959	2,834,632	4,780	54·6
1871 - - -	6,125,332	3,444,361	2,680,971	5,025	56·2
1872 - - -	6,373,390	3,510,353*	2,863,037	5,209	55·1

* Exclusive of 64,329 *l.* expended on works rendered necessary by the floods of 1871 and 1872, part of which is chargeable to capital.

Appendix, No. 3.

It appears from this that, although there has been a decline of traffic on the two chief railways of the country, the gross earnings for the year 1872 were greater than those of any preceding year; and while the cessation of the work of construction has thrown on the Revenue Account the whole cost of such charges as were previously shared with the Capital Account, the cost of working has not increased in such a way as to neutralise the benefit of the increase of earnings.

During the year 1873–74 the open mileage will exceed 5,600 miles, and some new traffic may be expected. On the whole lines the state of the goods traffic will depend on many circumstances which cannot be foreseen with precision. In the passenger traffic, however, an increase may be confidently expected. The number of third and fourth class passenger tickets (which constitute 95 per cent. of the whole number) issued during a series of years has been—

	No.
Year ending 30th June 1867 - - - - -	12,849,975
„ „ 1868 - - - - -	14,490,165
„ „ 1869 - - - - -	15,340,194
„ „ 1870 - - - - -	16,750,537
„ „ 1871 - - - - -	17,368,575
„ „ 1872 - - - - -	18,391,485

It is calculated that an increase of 10 per cent. over the number of passengers carried in the year ending 30th June 1872 would yield 150,000 *l.* of additional earnings.

Bearing in mind the present position of trade, and the circumstances affecting the different railways, it is considered that 2,900,000 *l.* should be taken as the best estimate that can now be formed of the net traffic receipts for 1873–74.

STATEMENT, No. I.

GUARANTEED RAILWAYS.

APPROXIMATE STATEMENT of Past EXPENDITURE and probable Future CAPITAL OUTLAY (both in *England* and *India*) during Six Years ending 31st March 1878.

NAME OF RAILWAY.	Length.	Total Estimated Cost after Reduction of Stores in Hand to Normal Amount.	Estimated Expenditure to end of March 1872.	PROBABLE EXPENDITURE IN						
				1872-73.	1873-74.	1874-75.	1875-76.	1876-77.	1877-78.	Six Years ending 1877-78.
	Miles.	£.	£.	£.	£.	£.	£.	£.	£.	£.
Great Indian Peninsula	1,286	23,525,000	23,250,000							
Bombay, Baroda, and Central India	313	7,725,000	7,665,000							
Ditto - - ditto - Ahmedabad to Wudwan	77									
Madras	857	10,650,000	10,040,000							
Ditto Beypoor to Cannanore (if sanctioned)	57									
East Indian, including Jubbulpore Extension	1,503	30,700,000	30,726,000*							
Great Southern of India	168	2,850,000	1,722,000							
Ditto Southern Extensions	216									
Carnatic—Arconum to Conjeveram	18¾	55,000	93,000							
Ditto - Madras to Cuddalore	85	510,000								
Ditto - Cuddalore to Tanjore	80	480,000								
Eastern Bengal	157	3,050,000	2,893,000							
Sindh, Punjab, and Delhi	662	10,400,000	10,220,000							
Oudh and Rohilkhund	544	6,000,000	3,400,000							
Ditto Moradabad to Ramnuggur †	47									
TOTALS	6,070¾	95,945,000	90,009,000	986,000	1,525,000	2,000,000	825,000	400,000	200,000	5,936,000

* It is estimated that the account of capital expenditure on the East Indian Railway will be reduced by 118,000 *l.* in 1872-73, and 335,000 *l.* more in 1873-74. The reduction of the stores in hand will cause similar decreases on other lines.

† To this is now added a proposal for about 110 miles of railway from Moradabad to Saharunpore. This is not included in the Statement, not being either provided for in the contract or sanctioned.

STATEMENT, No. II. - - - - - - - -

STATE RAILWAYS. - - - - - - - -

APPROXIMATE STATEMENT of Past EXPENDITURE and probable Future CAPITAL

NAME OF RAILWAY.	Length.	Actual Cost.	Approximate Expenditure from Loan Funds to end of March 1872.	1872-73.	
OPEN LINES.	*Miles.*	£.	£.	£.	
Calcutta and South Eastern - - - - - - - - - -	28	- - -	(*a*) 529,000	—	1
Nulhattee Branch - - - - - - - - - - -	27½	- - -	30,000	—	2
TOTAL - - -	55½	559,000	559,000	—	3
SANCTIONED LINES IN PROGRESS OR FINISHED, BUT NOT OPEN.*		Estimated Cost.			
Rajpootna—Agra to Sambhur Junction - - - - - - -	185½	1,030,000	113,000	281,000	4
„ Sambhur Junction to Nusseerabad with Salt Branch - -	69	415,000			
„ Delhi to Rewaree, including Furrucknuggur Branch - -	58	780,000	172,000	138,000	5
„ Rewaree to Bandikuri Junction - - - - - -	84				
Punjab Northern—Lahore to Jhelum - - - - - - - -	101	650,000	(*b*) 739,000	420,000	6
„ „ „ three large bridges, with protective works - - - -	3	1,200,000			
„ Jhelum to Rawulpindee - - - - - - -	69	475,000			
Indus Valley—Mooltan to Rohree - - - - - - - -	270	1,760,000	122,000	243,000	7
„ Kotree to Rohree, with Indus Bridge - - - - -	222	1,560,000	- - -		
Wurdah Coal Branch - - - - - - - - - - -	50	400,000	(*c*) 4,000	102,000	8
Holkar State—Khundwah to Indore - - - - - - - -	85½	1,000,000	36,000	160,000	9
TOTAL - - -	1,197	9,270,000	1,186,000	1,344,000	10
PROPOSED LINES.					
The Sindia State Railway - - - - - - - - - -	82	750,000	- - -	- - -	11
Indore to Oojein and Neemuch - - - - - - - - -	169	1,046,600	32,000	13,000	12
Western Rajpootana—Ahmedabad to Deesa and Ajmere - - -	330	1,650,000	- - -	- - -	13
Neemuch to Nusseerabad - - - - - - - - - -	134	823,400	- - -	- - -	14
Northern Bengal - - - - - - - - - - -	200	1,500,000	5,000	11,000	15
Rangoon to Prome - - - - - - - - - - -	160	895,000	- - -	- - -	16
Carwar to Gudduk - - - - - - - - - - -	145	1,015,000	34,000	14,000	17
Gudduk to Bellary - - - - - - - - - - -	90	500,000	- - -	- - -	18
Nagpoor to Chutteesgurh - - - - - - - - - -	130	780,000	- - -	- - -	19
Third rail from Kotree to Kurrachee, and from Mooltan to Lahore, on the Guaranteed Sindh, Punjab, and Delhi Railways - - - -	- - -	345,000	- - -	- - -	20
Puttamby to Cochin - - - - - - - - - - -	60	600,000	- - -	- - -	21
TOTAL - - -	1,500	9,905,000	71,000	38,000	22
TOTAL - - -	2,752½	19,734,000	1,816,000	1,382,000	23
Add—Expenditure by Secretary of State on Stores not appropriated to any particular line - - - - - - - - - -	- - -	- - -	22,000	—	24
GRAND TOTAL - - -	2,752½	19,734,000	1,838,000	1,382,000	25
LINES NOT CHARGEABLE TO THE REVENUES OF BRITISH INDIA.					
Nizam's State—Waddy to Hyderabad - - - - - - - -	123	1,100,000	120,000	600,000	26
Khamgaon Branch - - - - - - - - - - -	7½	49,000	49,000	—	27
Oomraotee „ - - - - - - - - - - -	5½	47,000	47,000	—	28

(*a*) Excludes outlay of 108,500 *l.* from ordinary grant on purchase of land and control, and 30,000 *l.* loss by exchange. As also 88,050 *l.* due to debenture holders, and which has still to be paid, so that the total outlay on the line has been 755,550 *l.*

STATEMENT, No. II.

STATE RAILWAYS.

OUTLAY (both in *England* and *India*) during Six Years ending 31st March 1878.

	PROBABLE EXPENDITURE IN						REMARKS.
	1873–74.	1874–75.	1875–76.	1876–77.	1877–78.	Six Years ending 1877–78.	
	£.	£.	£.	£.	£.	£.	
1	—	—	—	—	—	—	
2	—	—	—	—	—	—	
3	—	—	—	—	—	—	
4	575,800	475,200	- - -	- - -	- - -	1,332,000	* This excludes the Patree Branch, length 23 miles, to be executed from the ordinary grant; estimated *cost*, 100,000 *l.*
5	276,800	193,200	- - -	- - -	- - -	608,000	Delhi to Rewaree opened since this table was first compiled.
6	566,100	300,000	293,900	- - -	- - -	1,580,000	
7	609,200	745,800	900,000	700,000	- - -	3,198,000	
8	246,500	44,500	- - -	- - -	- - -	393,000	
9	283,800	440,200	80,000	- - -	- - -	964,000	Loan at 4½ per cent. from Holkar.
10	2,558,200	2,198,900	1,273,900	700,000	- - -	8,075,000	
11	26,800	300,000	300,000	123,200	- - -	750,000	Loan at 4 per cent.
12 13 14 15 16							Ditto to extent of 750,000 *l.* — From Sindia.
17 18 19 20 21	27,000	501,100	1,426,100	2,176,800	3,000,000	7,169,000	Minor past expenditure on surveys defrayed from the ordinary grant is excluded.
22	53,800	801,100	1,726,100	2,300,000	3,000,000	7,919,000	
23	2,612,000	3,000,000	3,000,000	3,000,000	3,000,000	15,994,000	
24	—	—	—	—	—	—	
25	2,612,000	3,000,000	3,000,000	3,000,000	3,000,000	15,994,000	
26	380,000	- - -	- - -	- - -	- - -	980,000	Constructed at charge of the Nizam.
27	—	—	—	—	—	—	
28	—	—	—	—	—	—	

(*b*) Excludes 6,000 *l.* debited to ordinary grant.

(*c*) Excludes 3,000 *l.* debited to ordinary grant.

STATEMENT, No. III.

APPROXIMATE STATEMENT of the Total NET CHARGE on the REVENUES of *India* on Account of GUARANTEED RAILWAYS, for the Six Years ending 31st March 1878.

	Actual Outlay to end of March 1872.	Estimated Outlay in 1872-73.	1873-74.	1874-75.	1875-76.	1876-77.	1877-78.
	£.	£.	£.	£.	£.	£.	£.
Capital outlay in each year - - -	- - -	986,000	1,525,000	2,000,000	825,000	400,000	200,000
Total ditto to end of each year - -	90,009,000	* 90,995,000	92,520,000	94,520,000	95,345,000	95,745,000	95,945,000
Charges on State:							
Interest on total ditto, at 5 per cent.	- - -	4,549,750	4,626,000	4,726,000	4,767,250	4,787,250	4,797,250
Land and Control - - - -	- - -	129,850	110,200	75,000	70,000	70,000	70,000
TOTAL Gross Charge - - £.	- - -	4,679,600	4,736,200	4,801,000	4,837,250	4,857,250	4,867,250
Estimated net earnings - - -	- - -	2,470,000	2,900,000	3,170,000	3,270,000	3,370,000	3,470,000
NET CHARGE on Revenue - £.	- - -	2,209,600	1,836,200	1,631,000	1,567,250	1,487,250	1,397,250

* The capital actually paid up and bearing interest on 31st March 1872 was 93,565,648 *l.*, and on 31st March 1873 it is estimated to amount to 93,735,924 *l.*

STATEMENT, No. IV.

APPROXIMATE STATEMENT of the Total NET CHARGE on the REVENUES of *India* on Account of STATE RAILWAYS, for the Six Years ending 31st March 1878.

	Actual Outlay from Loan Funds to end of March 1872.	Estimated Outlay in 1872-73.	1873-74.	1874-75.	1875-76.	1876-77.	1877-78.
LINES Constructed or Purchased from 4 per Cent. Loans.	£.	£.	£.	£.	£.	£.	£.
Capital outlay in each year - - -	- - -	1,222,000	2,328,200	2,559,800	2,920,000	3,000,000	3,000,000
Total ditto to end of each year * - -	1,802,000	3,024,000	5,352,200	7,912,000	10,832,000	13,832,000	16,832,000
Interest on total ditto at 4 per cent. -	- - -	120,960	214,088	316,480	433,280	553,280	673,280
LINE Constructed from 4½ per Cent. † Loan.							
Capital outlay in each year - - -	- - -	160,000	283,800	440,200	80,000	—	—
Total ditto to end of each year - -	36,000	196,000	479,800	920,000	1,000,000	1,000,000	1,000,000
Interest on total ditto at 4½ per cent. -	- - -	8,820	21,591	41,400	45,000	45,000	45,000
TOTAL Interest Charge - £.	- - -	129,780	235,679	357,880	478,280	598,280	718,280
Estimated net earnings - - -	- - -	- - -	13,700	77,500	200,250	280,550	340,000
NET CHARGE on Revenue - £.	- - -	129,780	221,979	280,380	278,030	317,730	378,280
	Miles.	*Miles.*	*Miles.*	*Miles.*	*Miles.*	*Miles.*	*Miles.*
Average length of line estimated to be open for traffic during each year -	- - -	- - -	150	775	1,335	1,810	2,125

* The cost of the Patree Branch is not included in this statement.

† This is the Holkar (State) Railway.

Appendix, No. 3.

STATEMENT, No. V.

SUMMARY.

APPROXIMATE STATEMEMT of the Total NET CHARGE on the REVENUES of *India* on Account of all RAILWAYS, for the Six Years ending 31st March 1878.

	1872-73.	1873-74.	1874-75.	1875-76.	1876-77.	1877-78.
	£.	£.	£.	£.	£.	£.
Guaranteed Railways - -	2,209,600	1,836,200	1,631,000	1,567,250	1,487,250	1,397,250
State Railways - - -	129,780	221,979	280,380	278,030	317,730	378,280
TOTAL - - - £.	2,339,380	2,058,179	1,911,380	1,845,280	1,804,980	1,775,530

(No. 98.—Public Works.)

Government of India.—Public Works Department.—Account.—General.

To His Grace the Right Honourable the Duke of *Argyll*, K.T., Secretary of State for India.

My Lord Duke, Simla, 9 September 1873.

WITH our Public Works Despatch, No. 76, of the 19th July 1873, we submitted a Forecast of the financial effects of carrying out the works in progress and contemplated from loan funds, and we promised to address your Grace more at length on the subject by a future mail. This we now proceed to do.

2. It has been determined within the last few years to carry out systematically the extension of Irrigation Works and of Railways by the direct agency of Government departments, and from funds provided by the State, abandoning the system of carrying on large extensions of such works by the agency of companies working under a Government guarantee. This determination has been carried into practical effect to a considerable extent, and we have thought it right and prudent now to make a review in some detail of the state and prospects of the operations, whether already in progress, or proposed to be undertaken at an early period.

3. While we had this intention in course of execution, we received your Grace's Despatch, No. 33, dated 11th April 1872, in which the same thing was enjoined upon us. We have thus felt the more the importance of making a review and forecast of our operations. And this has still further been impressed upon us by the hesitation your Grace has felt in according sanction to various proposals we have submitted to you, apparently from a feeling of apprehension that we were drifting into a larger scheme of operations than the resources of India could well afford.

Northern Bengal Railway, *vide* Telegram, dated 9th May 1873.
Nagpoor and Chutteesgurh Railway, *vide* Despatch, No. 65, Railway, dated 1st May 1873.
Indore and Nusseerabad Railway, *vide* Despatch, No. 37, Political, dated 9th April 1873.
Sungum Project, *vide* Despatch, No. 71, dated 31st July 1872.

4. We have, as already reported, taken steps to remove from the list of irrigation works in contemplation several projects of which we doubt either the need for proceeding with them at once, or the prospect of adequate returns. In other cases we have, without stopping the works, ordered that they shall be charged to the ordinary revenues, and shall not be classed as extraordinary. Such works of course do not find place in the Forecast.

Madras Water Supply Project, Despatch No. 20, dated 16th February 1872.
Bombay and Sindh, Despatch No. 8, Irrigation, dated 13th January 1873.
Sardah Canal, Despatch No. 9, Irrigation, dated 15th January 1873.
Chembrumbaukum Tank, Despatch No. 22, Irrigation, dated 12th February 1873.

5. After much careful labour and consideration, the Forecast submitted in the shape of a Government Resolution, with three explanatory memoranda, has been completed and reviewed in our Public Works and Financial Departments. We leave it to the documents themselves to tell their own tale; and we will have only to add that we trust your Grace will be satisfied, as we are, that the works we have in progress and under consideration, may all, if approved, be carried out without financial difficulty.

6. The advantage of such a Forecast as a scheme for practical use will be great. We need not be distracted by the proposal of new schemes for immediate execution. The

Appendix, No. 3.

budgets of each year may now be framed in accordance with the Forecast. And the Forecast Tables may be reviewed and revised annually, so as to admit of any fresh projects being added as others are completed. And in this way we trust that the works decided upon as the most suitable to be undertaken may be carried forward at a regular rate of progress.

7. It is to be noted that the Forecast submitted starts on the basis of the Budget Estimate of the Public Works Department, as settled in January last. It has been thought best not to alter in the tables the estimate for 1873–74 from that of the Budget. But it will doubtless be remarked that the question of gauge may affect the outlay calculated on for the Indus Valley and Punjab Northern Lines; and that your Grace's orders to defer the completion of the Warda Valley Railway render necessary a deviation from the Budget Estimate in regard to that line.

8. It will be interesting and instructive to compare the scheme comprehended in the present forecast with the previous general reviews contained in Major General Strachey's Memorandum of 10th February 1865 on Irrigation Works,* and Lord Lawrence's Minute of 9th January 1869 on Railways.†

9. To begin with the Irrigation Works. The present Forecast includes projects of which the estimates amount in all to 20,325,000 *l.* Major General Strachey's Memorandum included, in all, projects amounting to 29,000,000 *l.* This was eight years ago. Since then a capital outlay of 5,250,000 *l.*, of which one million has been charged as ordinary expenditure, has taken place on Irrigation Works. And again Major General Strachey's Memorandum included all the works then supposed to be necessary to place India in a good condition as to the provision of such works; while the present Forecast only looks to what should be undertaken within the next five years. Bearing these facts in mind, there is no great difference in the general result of the two reviews.

10. We will now go over the programme of works in comparison with Major General Strachey's review, taking them in the order of the Forecast Table, putting together the "sanctioned" and "contemplated" under each territorial division for comparison with Major General Strachey's note where they are arranged according to Local Governments.

MADRAS.

	£.
Sanctioned—Godavery Delta Works extensions	246,000
Kistna - - - ditto	570,000
Pennair	55,000
Cauvery	90,000
Other Projects	263,000
Contemplated—Pennair extension, &c.	410,000
TOTAL £.	1,634,000

Major General Strachey set down 5,000,000 *l.* as the sum likely to be ultimately required for Madras. We have, as yet, not nearly come up to this, and probably so large an expenditure will not be required for many years to come, though it is possible the Government may eventually have to take over the Madras Irrigation Company's scheme, on which 1,600,000 *l.* have been expended.

11. We next take—

BOMBAY AND SINDH.

	£.
Sanctioned—Moota Project	500,000
Taptee „	300,000
Other Projects	350,000
Sindh—Several Projects	131,000
Eastern Narra, &c.	867,000
Desert Canal	96,000
TOTAL £.	2,244,000

Seven millions were entered in Major General Strachey's table; but our present programme omits the attempt to establish perennial irrigation in Sindh, which, as reported in our Public Works Despatch, No. 8, dated 13th January 1873, we consider should be given up, for the present at least. And as regards Bombay proper, the expense of the works and the absence of any sufficient example of financial success, make it desirable to be cautious in undertaking more projects.

12. Next

* Enclosed in our Public Works Despatch, No. 29, dated 9th March 1865.
† Enclosed in our Railway Despatch, No. 24, dated 11th March 1869.

Appendix, No. 3.

12. Next comes—

BENGAL.

	£.
Sanctioned—Orissa Project	2,770,000
Soane „	3,775,000
TOTAL £.	6,545,000

Here Major General Strachey's table only sets down 2,000,000 *l.*; but it is to be remembered that at that time both the Soane and Orissa works were in the hands of a joint stock company. Further irrigation projects may be required hereafter in Bengal and Behar; but we do not contemplate undertaking them within the period embraced in the present forecast.

13. In the North Western Provinces we have the following:—

	£.
Sanctioned—Remodelling Ganges Canal, including new branches and completing distributaries.	850,000
Agra Canal	575,000
Lower Ganges Canal	1,699,000
Contemplated—Eastern Ganges Canal	845,000
Other Projects	328,000
TOTAL £.	4,297,000

Major General Strachey set down for the North Western Provinces—

	£.
Completion of Ganges Canal	750,000
Canals in Rohilkhund, including Ramgunga, since modified into Eastern Ganges Canal.	500,000
Agra (or Delhi) Canal	750,000
Works in Bundelkhund	500,000
Canals from Tonse	250,000
TOTAL £.	2,750,000

But the idea of the Lower Ganges Canal was not then fully accepted. This, with its effect on the original Ganges Canal, accounts fairly for the difference.

14. In the Punjab are the following projects:—

	£.
Sanctioned—Sirhind (Sutlej) Canal	2,980,000
Baree Doab Extension	1,100,000
Western Jumna Canal Extension	1,170,000
Contemplated—Swat River Project	147,000
TOTAL £.	5,397,000

This is against 6,250,000 *l.* set down in Major General Strachey's note—

	£.
Completion of Baree Doab Canal	500,000
Sutlej Canal	2,000,000
Western Jumna improvements	250,000
Jumna and Cuggur waters to Bhuttee Territory	250,000
Inundation Canals from Sutlej	250,000
Chenab Canal	2,000,000
Sind-Sagur and Trans-Indus	1,000,000
TOTAL £.	6,250,000

The difference is due partly to the rise in the estimates of the Sirhind and Baree Doab projects, and to the great extension which has taken place in the proposals for the Western Jumna project; while, on the other hand, the Chenab project does not find a place in our programme, nor do the Lower Sutlej project and the Sind-Sagur and Trans-Indus projects on the large scale contemplated formerly. Provision has, however, been made for completing the survey for the Derajat Canals. The result of the surveys will decide whether the works themselves shall find a place in the forecast.

15. For Oudh, Major General Strachey set down 4,000,000 *l.* for the Sardah Canal. The fully-matured project, but embracing a smaller area than originally intended, amounted

Appendix, No. 3.

to 3,000,000 *l.* We reported in our Public Works Despatch, No. 9, Irrigation, dated 15th January 1873, the reasons why we decided to postpone this project.

16. In the Central Provinces we contemplate at present only the Ramtek project, 108,000*l.* Major General Strachey set down 1,000,000 *l.* for expenditure in the Central Provinces. We think it proper only to undertake one experimental work, as irrigation of any kind is new here, and the prospects of irrigation are generally as doubtful as in Bombay proper.

17. We have nothing in our programme for irrigation in Burmah. Embankment works are being gradually carried out from the ordinary revenues. Irrigation works may follow, but probably not at an early date.

In other minor provinces we have set down for the small tanks we have in hand 100,000*l.* There is no corresponding entry in Major General Strachey's note.

18. The subject of the revenue to be derived from irrigation works is only generally treated of in Major General Strachey's Memorandum. He shows in his 22nd, and in the 96th and following paragraphs how there is reason to believe that the outlay proposed will impose no permanent burden on the State. It may be as well here to make a few remarks on the returns to be expected from the works, especially in regard to the slow growth of such returns, as exemplified in all cases of the larger works recently undertaken. We have been led to think that this feature has not been sufficiently appreciated, and lately addressed your Grace on the necessity of bearing this in mind. We should not, on the one hand, be led away by sanguine expectations, nor, on the other, fall into distrust of the profitableness of irrigation works, because large returns fail to be at once realised. This subject is dwelt upon in the 11th and 12th paragraphs of the second memorandum of the Forecast. But while we think it right to calculate, in a forecast, only on profits on a very low scale, it is of course necessary that individual projects should give better promise before they can be accepted. The usual tendency of estimates for the costs of construction of works to increase, renders it absolutely necessary to make this distinction.

Despatch, No. 22, P.-W., of 21st February 1873.

19. It may be argued that the rate of interest is likely to rise, and that any slightly unfavourable circumstances would turn the profit into a loss, and that, therefore, it is not worth while to undertake irrigation works on so slight a prospect of financial success. But it is to be recollected that besides the direct and calculable results of the working of a canal, we must also take into consideration other indirect effects. Among these may be mentioned the security of the land revenue in exemption from remissions, and the gradual enrichment of the districts through which a canal passes, with its effect on all branches of the Government revenues. The rise of the revenue from the land and from other sources in the Godavery and Kistna Districts of Madras are notable instances. And there is, above all, the mitigation of, if not security from, famine which irrigation affords. These circumstances would be quite sufficient to justify the undertaking of such works, even were it necessary to assume that there will be possibly some loss, it being clear that the ultimate results will lay no serious burden on the general revenues. The probabilities are, however, on the contrary, that there will be an enhancement of the general revenues as such works are carried out.

20. We turn now to railways. We must first refer to the question of railway revenue. In the Minute by Lord Lawrence, which accompanied Despatch, No. 24 R, dated 11th March 1869, the estimated charge on the revenues of India on account of the then existing guaranteed railways was shown for a series of years. Upon the correctness of this estimate much depended, for as it was thought essential that the total charge on the revenues, on account of all railways, should be limited to a fixed sum: the difference between this total charge and the charge for the guaranteed lines represented the sum that remained available to defray the charges arising from the construction of new railways. The progress of the Indian railways in past years was therefore reviewed, and an estimate framed on the basis of the previous rate of progress, and on the financial results of railway construction in other parts of the world.

21. It was observed that the net charge on the revenues of the State on acccount of the existing railways was, in the year 1869, approximately one million sterling, and it was estimated that this charge would decrease at the rate of 75,000 *l.* a-year, so that at the end of 10 years it would be reduced to 250,000 *l.*, and it was assumed that it would be further reduced at the end of 20 years to 150,000 *l.*

This expectation has as yet not been realised. It is now estimated that in the current year, 1873–74, the charge on the revenues on account of the guaranteed railways will be 1,830,000 *l.*, instead of 775,000 *l.* as estimated in 1869. Moreover, there is no sufficient ground for assuming that this charge will fall very rapidly in the next few years. It would hardly be prudent to reckon upon a smaller charge for the year 1877–78 than the amount of 1,397,000 *l.* shown in the Forecast; and this charge is greater than the estimate of 1869, by a sum little short of one million sterling.

22. It must be acknowledged that the original estimates were too sanguine. At the time they were framed the great trunk lines were approaching completion, and it was hoped that the traffic which had been developed on the isolated railways would greatly increase as soon as these lines were connected, and the cities of Calcutta, Bombay, Madras, and Lahore were placed in communication with each other. This has not been the case, and indeed

indeed the earnings of the railways have not kept pace with the increase in the open mileage. In 1868, the gross receipts per mile open were 1,362 *l.* In 1869, they increased to 1,412 *l.*; but in 1870, 1871, and 1872, they fell to 1,307 *l.*, 1,219 *l.*, and 1,224 *l.* respectively.

23. To some extent, this result may be traced to special circumstances, such as the condition of trade (as an instance of which we may cite the decline in the seed traffic of the East Indian Railway) and the failure of some of the railway works under the pressure of heavy floods; but there has also been an unexpected want of expansiveness in the general railway traffic of the country, for which no remedy has yet been found, and which must be taken into account in all estimates of railway charges. This has been done in the Forecast, and the estimate of net earnings for future years is based on the assumption that the gross earnings per mile will be, in round figures, 1,150 *l.*, 1,210 *l.*, 1,210 *l.*, 2,235 *l.*, and 1,270 *l.* in the five years from 1,773–74 to 1877–78.

24. The actual figures for the past five years, and the estimated figures for the next five years, are as follows:—

	Per Open Mile.		
	Gross Receipts.	Working Expenditure.	Net Profits.
ACTUAL:	£.	£	£.
1868	1,362	731	631
1869	1,412	794	618
1870	1,307	714	593
1871	1,219	685	534
1872	1,224	674	550
Average £.	-	-	585
ESTIMATED:			
1873–74	1,151	633	518
1874–75	1,211	666	545
1875–76	1,211	666	545
1876–77	1,233	678	555
1877–78	1,271	699	572
Average £.	-	-	547

25. We will now compare the projects entered in Lord Lawrence's Minute with those included in our Forecast. And, first, it is to be noted that Lord Lawrence contemplated the construction of lines on the broad gauge at an average cost of, possibly, 12,000 *l.* per mile. He, however, regarded the possibility of constructing some lines on the narrow gauge.* He contemplated an outlay of 3,750,900 *l.* per annum, and expected—

* *See* paragraphs 32 and 43.

	Miles.
To finish works in hand	1,754
To undertake and complete between 1869–70 and 1874–75	1,538
And also between 1474–75 and 1879–80	1,555
Total New Lines	4,847
Add previously constructed	4,141
TOTAL Length of Line to be open by April 1880	8,988

26. Our Forecast contemplates an outlay of 3,000,000 *l.* per annum, and by April 1878 to have ready—

	Miles.
Guaranteed Railways	6,070
State Railways	2,700
TOTAL	8,770

The length of lines contempleted in our Forecast is therefore (alllowing for the shorter period included in it) somewhat greater than had been hoped for, and the outlay less. But the use of the narrow gauge, as decided on, with your Grace's sanction, by Lord Mayo's Government, in 1870, is calculated upon, both to reduce the mileage cost and to faciltate progress in construction.

27. The

Appendix, No. 3.

27. The only State Railway set down in Lord Lawrence's Minute, as in progress, is that from Lahore to Rawul Pindee. The work is, however, in progress only as far as Jhelum, but surveys to Rawul Pindee are ready, and the works might be started beyond Jhelum as soon as considered desirable, but for the question of gauge treated of in a separate Despatch. The great object, however, is first to complete the three large bridges, which will cost twice as much as all the rest of the work of the narrow gauge line between Lahore and Jhelum. These bridges have made excellent progress during the last two seasons, and we may hope they will be completed in 1875-76.

28. The railways set down in Lord Lawrence's Minute as to be undertaken and carried out within the first five years, or say, from 1870 to 1874, are—

1. *Kotree to Mooltan.*—Of this, we have the half from Mooltan to Rohree (270 miles) well in hand, and a commencement has been made on the works between Rohree and Kotree. The question of gauge, however, affects the progress of the works here also.

2. *Jhelum to Pind Dadum Khan.*—This salt branch has been surveyed, but it is not yet settled to undertake it.

3. *Delhi to Jeypore and Ajmere, with Branches to Sambhur and Bhowanee.*—The scheme has been so far altered as to give up the Bhowanee branch, and to extend the line to Agra as well as Delhi, making the line from Agra to Ajmere the main line. The whole scheme is in hand on the narrow gauge. From Delhi to Rewaree the line is finished and working; from Agra to Sambhur junction the line is let on contract, to be finished in June 1874; and the remainder is also in rapid progress.

4. *Indore to Great Indian Peninsula Railway.*—This, the Holkar State line, 84 miles long, is let on contract, to be finished in December 1874.

5. *Kooshtea to Darjeeling.*—The line to Rungpore, with a possible branch to the foot of the Himalayas below Darjeeling, has been surveyed and estimated for, and is nearly ready for final sanction; but there is great difference of opinion as to which line to take for the extension in view to ultimately communicating with Assam. The question is now under investigation by the "Northern Bengal Railway Survey."

6. *Calcutta to Midnapoor, Cuttack, and Ganjam.*

7. *Ganjam to Bezwara.*

8. *Branches to Coconada and Masulipatam.*
Nothing has been done in regard to these three projects. Neither the Madras nor the Bengal Government took the matter up, and it has, for the present, been allowed to drop.

9. *Branches of Madras Railway.*—A branch from Coimbatore to Metapollium is being completed.

10. *Arconum to Tanjore, Madura, and Tinnevelly.*

11. *Branches to Pondicherry and Tuticorin.*
These are to be undertaken by the Guaranteed Companies, and as the narrow gauge has been adopted, the system will commence at Madras instead of at Arconum. Estimates for the line from Madras to Cuddalore have been passed, and the southern portion has been sanctioned as a concession to the Great Southern of India Railway Company. Complete arrangements will follow the amalgamation of the companies. A separate company is in treaty for the Pondicherry branch.

12. *Beypoor to Trevandrum and Tinnevelly.*

13. *Beypoor to Mangalore and Karwar.*
The portion from Beypoor, or rather Putamby to Cochin, has been approved for survey. Nothing is proposed at present for the rest.

14. *Bangalore*, viâ *Hassan to Tungâbuddra.* This Mysore project has been surveyed and estimated. But it was deemed proper to defer it for the present, in consideration of the more pressing demands on the Mysore resources for irrigation works.

15. *Koolburga to Hydrabad.*—Waddy is the junction with the Great India Peninsula Railway instead of Koolburga. Otherwise this project is in progress as intended, and is expected to be completed in 1874.

16. *Dharwar to Karwar.*—This project has been drawn up, and sent to the Secretary of State for sanction, and the matter now awaits decision in England.

17. *Munmar to Dhoond.*—This line was intended to join the two branches of the Great Indian Peninsula Railway above the Ghâts. It was proposed to the company

pany by the Secretary of State, but not appreciated, and the project has been allowed to drop for the present.

18. *Branches to the Great Indian Peninsula Railway.*—Two short cotton branches have been carried out and finished. Also the Wurdha coal branch is in hand for 18 miles.

19. *Ahmedabad to Wudwan.*—This has been sanctioned as an extension of the Bombay, Baroda, and Central India Company's lines, and was finished and opened lately. The Patree Salt Branch (charged to ordinary revenue) is also finished as a Government line, to be worked by the Bombay, Baroda, and Central India Railway Company. A branch from Anund to Dakore has been recommended for sanction.

20. *Kattyawar Lines.*—Nothing done as yet beyond Wudwan.

21. *Rangoon and Prome.*—This project is to be submitted shortly to Her Majesty's Government for orders.

29. The above embrace all the lines included in Lord Lawrence's Minute for execution within the first period of five years. A large proportion of the works has been set in hand, or is ready to be so. But, besides these lines, steps have been taken towards four other State railways.

30. One of these is the *Nagpoor* and *Chutteesgurh* line, which was set down by Lord Lawrence for the second period of five years. Her Majesty's Government have, for the present, postponed sanction to this work.

31. The next is the line from *Indore to Nusseerabad,* viâ *Neemuch,* with a branch to Oojein. The project for this work has been sanctioned as far as Neemuch, and will be begun immediately from Indore to Oojein and Rutlam, Her Majesty's Government allowing it to go on, for political reasons, in consideration of Maharajah Scindiah's loan of 750,000 *l.* Lord Lawrence's Minute set down this project for the second and third periods of five years.

32. The third is the line from *Ajmere,* viâ *Pahlunpoor, or Deesa to Ahmedabad.* A survey is in progress, and a preliminary project based thereon is expected in a few weeks. Lord Lawrence's Minute contemplated a direct line from Neemuch to Baroda in the second and third periods of five years, and an extension of the Bombay, Baroda, and Central India Railway to Decca in the fourth period of five years.

33. The fourth is a railway from Agra to Gwalior, to be called the Scindiah State Railway, for which the Maharajah has engaged to supply on loan 750,000 *l.* This, with an extension to Jhansie, was set down by Lord Lawrence for the fifth period of five years.

34. We have also recommended for sanction a railway about 110 miles long to connect the Oudh and Rohilkhund Railway, *viâ* Ahmedabad, with the Scinde, Punjab, and Delhi lines at Saharunpore. This was set down in Lord Lawrence's Minute for the second period of five years.

35. Thus it will be seen that the policy sketched out and approved during Lord Lawrence's administration, and pursued during the Government of the late Earl of Mayo, is being carried out under the present Government with only minor modifications. And we may again express a hope that your Grace will be satisfied that without any fear of financial embarrassment, the same policy may continue to be pursued, and a reasonably rapid progress secured in the extension of irrigation works and railways.

36. Any further remarks and recommendations we may have to make in regard to the projects embraced in the foregoing review will be submitted to your Grace in separate Despatches.

We have, &c.
(signed) *Northbrook.*
Napier of Magdala.
R. Temple.
B. H. Ellis.
H. W. Norman.
A. Hobhouse.
E. C. Bayley.

Appendix, No. 3.

(No. 64, Public Works.)

Government of India.—Public Works Department.—Account.—General.

To the Most Honourable the Marquis of *Salisbury*, Secretary of State for India.

My Lord Marquis, Simla, 11 June 1875.

Nos. 76 and 98 of 19th July and 9th September 1873.

WITH reference to our Despatches, quoted in the margin, we have now the honour to transmit a Resolution with Tables and an Explanatory Memorandum giving a Forecast of the operations we have in hand in the extension of railways and irrigation works, and of the probable receipts and charges connected with them. These papers form a revision and extension of the Forecast made in 1873, and will, we trust, be found to contain all necessary information, so that it appears to us to be unnecessary to add any remarks in this Despatch on the papers now forwarded.

2. We beg, however, to make two explanations with reference to the Duke of Argyll's Despatch * in which the receipt of our letters above quoted was acknowledged.

* No. 3, Public Works, dated 14th January 1874.

3. In the fifth paragraph his Grace remarked, "The data on which these calculations are based have no doubt received your careful attention. But the disappointment which has attended similar expectations in the past precludes me from feeling any great confidence in them for the future." We understand this to refer to the subject of the 20th and 21st paragraphs of our Despatch, No. 98, of 9th September 1873, in which, after citing Lord Lawrence's Minute of 1869, we made the following remarks:—"It was observed that the net charge on the revenues of the State on account of the existing railways was, in the year 1869, approximately 1,000,000 *l.* sterling, and it was estimated that this charge would decrease at the rate of 75,000 *l.* a year, so that at the end of 10 years it would be reduced to 250,000 *l.*, and it was assumed that it would be further reduced at the end of 20 years to 150,000 *l.* This expectation has not as yet been realised. It is now estimated that in the current year, 1873–74, the charge on the revenues on account of guaranteed railways will be 1,830,000 *l.* instead of 775,000 *l.* as estimated in 1869." We regret that in these remarks and calculations there was an oversight which renders the comparison erroneous which we drew between the Forecast of 1869 and the actual results. The "existing railways" referred to in 1869 were the railways for which 78,000,000 *l.* sterling† of capital had been raised; and the charges connected with these, it was supposed, would be reduced to 775,000 *l.* in 1873–74. But the guaranteed railways, for which the charges were calculated at 1,830,000 *l.* in the budget of 1873-74, were railways for which capital to the amount of 96,000,000 *l.* had been raised. The charges connected with the additional 18,000,000 *l.* go far to make up the difference. In fact, if the whole Forecast of 1869 for "new and existing railways" had been taken, instead only of the part relating to "existing" lines, that Forecast would have appeared fairly correct (saving the exceptional year 1872–73), as the figures in the margin will show.‡ We regret that the matter was not more closely examined at the time.

† Lord Lawrence's Minute, paragraph 29, &c.

‡ Comparison of Charges connected with Railways.

Years.	Forecast of 1869.	Forecast of 1875.
	£.	£.
1872–73 -	1,412,500	2,407,928
1873–74 -	1,525,000	1,845,519
1874–75 -	1,607,500	1,591,605
1875–76 -	1,684,000	2,144,823
1876–77 -	1,754,500	1,965,679
1877–78 -	1,819,000	1,939,265
1878–79 -	1,862,500	1,840,765
1879–80 -	1,885,000	1,783,265

1872–73 is taken as the third year of the Table at paragraph 32 of the Minute of 1869, and so forth. The column for the Forecast of 1875 is filled with the aggregate net charges for State and Guaranteed Railways together, as at paragraph 19 of the explanatory memorandum.

4. In the concluding paragraph of the Duke of Argyll's Despatch, his Grace stated that he would have much preferred that the Forecast of 1873 had not been made public. As his Excellency the Viceroy has received an intimation from your Lordship that the objection to the publication of a Forecast has been withdrawn, we have published the Resolution and Forecast Tables herewith submitted in the "Gazette of India."

5. In conclusion, we beg to state that we have under consideration paragraphs 48 to 57 of your Lordship's Financial Despatch, No. 387, of the 23rd July last, relating to Public Works Extraordinary, and that we propose to address your Lordship upon the subject after careful consideration of the manner in which the transaction relating to such works should be entered in future in the Estimates and Accounts of the Empire. In this we shall have the advantage of the assistance of Sir Andrew Clarke, who is shortly expected to take his seat as a Member of Council.

We have, &c.
(signed) *Northbrook.*
Napier of Magdala.
H. W. Norman.
A. Hobhouse.
W. Muir.
A. J. Arbuthnot.
A. Eden.

Appendix, No. 3.

(Nos. 354 A—G.)

Government of India.—Public Works Department.—Account.—General.

Simla, 11 June 1875.

FORECAST of EXPENDITURE from EXTRAORDINARY FUNDS on RAILWAYS and IRRIGATION WORKS.

READ again—

Resolution in the Public Works Department, No. 377A—G., dated 18th July 1873

Read also—

Tables and Memorandum prepared in the Public Works Department, dated 11th June 1875.

OBSERVATIONS.—In July 1873 a Resolution was published in the "Gazette of India" reviewing the contemplated operations for the extension of Railways and Irrigation Works in India, with a Forecast of the probable result of an annual outlay of 4½ millions sterling for five years. The conclusion arrived at by the Government of India was, that the operations might be continued on that scale without fear of financial embarrassment. But it was added in conclusion that the arrangements permitted of the rate of expenditure being contracted if a reduction should be found necessary.

2. The basis of the calculations made in 1873 was this:—

In the year 1872-73, after deducting the net receipts derived from works in operation, there remained a sum of 2,378,140 *l.* charged to revenue for the interest of money borrowed, whether directly by Government or indirectly through guaranteed companies, for the construction of "reproductive" public works. The term "reproductive" is meant to imply not that all these works are likely to be in themselves remunerative as an investment of capital, but that their effect will be to add to the general wealth of the country. The condition of the finances was such as to satisfy the Government of India that a similar charge of 2,378,140 *l.* might be met in future years without increased taxation.

As works under progress are completed, and as those lately completed are brought into fuller work, fresh receipts will come in; some increase is also to be expected from old works. In the Forecast of 1873 the rate of expenditure upon works in progress and new works was so adjusted for five years, that the estimated additional annual charge upon revenue for the interest of money to be borrowed should be met by the estimated additional receipts, and no increased annual charge upon revenue should be incurred. The calculations then made showed an estimated annual charge upon revenue in every year after 1872-73 considerably below the charge incurred in that year.

3. These calculations can be now compared with the actual results of the last three years; thus:—

	Forecast of 1873.	Present Information.	Based on
Excess of Interest Charges over Net Receipts:	£.	£.	
1872-73 - - - - - -	2,378,140	2,357,696	Actuals.
1873-74 - - - - - -	2,127,579	1,780,833	„
1874-75 - - - - - -	2,019,780	1,565,705	Regular Estimate.

Appendix, No. 3.

It will be seen that the Forecast of 1873 has been more than justified by the facts. The large decrease of the net annual charge in 1873-74 and 1874-75 is due in a great measure to the increase in the profits of the guaranteed railways, owing to the great extension of the grain traffic during the famine of 1873-74. But detailed calculations show that without taking those profits into account the calculations of the Forecast of 1873 would have been perfectly safe.

4. Since the publication of that Forecast it has been deemed expedient to limit the annual outlay on reproductive public works, classed as extraordinary, for the prosecution of which funds are authorised to be raised by loan, if necessary to four millions sterling.

5. New tables have been prepared on this basis. They include the operations of 1872-73 and 1873-74 taken from the accounts of actual outlay, and those of 1874-75 taken from the regular Estimate. The operations for 1875-76 are taken from the Budget Estimate, and those of the following four years from the best estimate that can be formed of probable operations. The new Forecast extends to the financial year 1879-80. The excess of interest charges over net receipts is estimated to decrease from 2,357,696 *l.*, the actual charge in 1872-73, to 1,939,806 *l.* in 1879-80. This charge is expected to average 2,023,126 *l.* per annum from 1875-76 to 1879-80, as shown in the margin. The even progress of the fall was interrupted by the earnings of the famine traffic in 1873-74 and 1874-75; but the regular series is resumed in 1875-76. The result is on the whole much the same as in the calculations of 1873.

	£.
1875-76 - - -	2,179,294
1876-77 - - -	2,010,920
1877-78 - - -	2,022,306
1878-79 - - -	1,963,206
1879-80 - - -	1,939,806
Total - - £.	10,115,632
Average per annum	2,023,126

6. The principal circumstances which have led to alterations in the present Forecast as compared with that of 1873 are the following. The total annual outlay has been limited to 4 millions sterling with full effect from 1876-77. The estimated cost of the State Railways has been considerably affected by the decision to make the Indus Valley, the Punjab Northern, and the Scindia lines on the broad gauge, which necessitates a larger outlay of capital without a corresponding increase of traffic receipts. The outlay upon irrigation works is concentrated on fewer projects. The interest has been calculated at 4½ instead of 4 per cent. It is to be noted that interest has been calculated on the entire sum charged under the head Extraordinary, while no deduction has been made for receipts from irrigation works in Madras, Bombay (including Sindh), and Rajpootana, in consequence of the manner in which the receipts derived from irrigation are to be separated from the land revenue not having been finally decided. No allowance has been made for the probability that surplus revenue will be applied to the construction of reproductive works. It will thus be seen that a considerable margin has been allowed for safety in these calculations.

7. The result of the new Forecast is satisfactory. It appears that, taking a moderate estimate of the growth of income from existing railways and irrigation works, and very small returns from the new works, an annual capital outlay of 4 millions for the next five years on State railways and irrigation works charged with interest at 4½ per cent. is not likely to lead to any increase of annual charge on the revenues of India.

8. The progress intended to be effected in the works in hand according to this Forecast, is as follows:—

Guaranteed Railways.

9. All the guaranteed railways are open for traffic complete, with the exception of the Oudh and Rohilkund and South of India Railways.

Of the Oudh and Rohilkund Railway 539¾ miles have been opened for traffic. The bridge over the Ganges at Cawnpore will be completed before the end of the current year, and connection established with the East India Railway. The total mileage then open for traffic will be 544 miles. It is, as yet, uncertain when the remaining sections of the Oudh and Rohilkund Railway as originally projected, viz., from Buxar to Akbarpore, and a branch to the foot of the hills near Raneekeet, will be undertaken.

The South Indian Railway is to be of 619¾ miles in length on the metre gauge, of which 167 miles from Negapatam to Erode (at present on the 5 feet 6 inches gauge, but to be converted to the metre gauge) are open; also 18¾ miles from Arconum to Little Conjeveram (at present on 3 feet 6¾ inches gauge). The southern extension, 215¾ miles on the metre gauge, from Trichinopoly to Tuticorin, with a branch to Tinnevelly, is expected to be opened throughout in 1875-76, and the northern extension, 218 miles, from Madras to Tanjore in 1876-77.

State Railways.

10. The progress expected in the State Railways, is as follows:—

The Punjab Northern Railway, 103 miles in length, from Lahore to Jhelum, will be completed on the broad gauge on a bank separated from the Grand Trunk Road, and opened for traffic in	1876-77.
The Rajpootana Railway, on the metre gauge, 323 miles of which are already open, will be completed and in work, from Delhi and Agra (including the bridge over the Jumna at Agra), to Ajmeer and Nusseerabad, a length of 396 miles - - - -	,, 1876-77.
The Wardha Valley line for the supply of coal from the Warora Colliery to the Great Indian Peninsula Railway will be completed and at work, 46 miles, on the 5½ feet gauge - -	,, 1876-77.
The Rangoon and Irrawaddi Valley Railway, 161 miles, on the metre gauge, will be completed to Prome - - - - -	,, 1877-78
The Indus Valley Railway from Kotree to near Mooltan, 498 miles in length, will be completed on the 5½ feet gauge, and opened for traffic, including the large bridges over the Sutlej at Bahawalpore, and over the Indus at Sukkur - - - -	,, 1878-79.
The Holkar State Railway, of which 57 miles are now open for traffic, will be completed from Khundwa to Indore, including the bridge over the Nerbudda, and will be extended to Neemuch and Oojein, a length in all of 254½ miles, on the metre gauge - - - - - - - - - - - - -	,, 1878-79.
The Scindia Railway (72 miles of 5½ feet gauge) will be completed from Agra to Gwalior, including the large bridge over the Chumbul - - - - - - - - - - -	,, 1879-80.
The Northern Bengal Railway, 225 miles on the metre gauge, from the Ganges above Kooshtea to the foot of the Darjeeling Hills will be completed and opened for traffic - - - - -	,, 1878-79.
The Tirhoot Railway, 110 miles on the metre gauge, which occupies the principal lines over which the grain was carried in the recent famine relief operations, and of which the permanent line from the Ganges to Durbungha, 50 miles, will be finished in 1875-76, will be completed - - - - - - - -	,, 1877-78.

The above operations embrace the completion of 1,865 miles of State railway, of which 719 miles will be on the broad, and 1,146 miles on the narrow (metre) gauge. Other lines of railway will also be undertaken as the completion of these sets free funds and staff.

Irrigation Works.

11. For irrigation works, the progress expected is as follows:—

Madras.

Godavery Delta Works.—Eastern and Western Deltas: Rectifications and necessary additions to existing works, improvements to the distributary system, and some additional lengths of channel required for an extension of the irrigated area, are being carried on as rapidly as the available supply of labour will admit, and will probably be completed by the year 1879-80.

Similar operations in the Kistna Delta. A large proportion of those already sanctioned will probably be finished by 1879-80, but owing to the limited supply of labour, the work can only be carried out slowly.

Similar operations in Pennair Delta will probably be completed by the year 1877-78.

Weir across the Vellaur River.—Will probably be completed by the year 1876-77.

Works in the Cauvery Delta.—These are works for regulating the supply of water to the several natural channels which distribute the irrigation from the Cauvery weirs in the districts of Tanjore and Trichinopoly. They are all nearly complete, with one exception, the estimates for which are not yet sanctioned.

Streeviguntum Weir Project.—A new work across the river Tambrapoorney in the Tinnevelly district; in great part completed, and will probably be finished by 1877-78.

Bombay.

Ekhrookh Tank and Mookti Reservoir.—Nearly complete; will probably be finished by 1876-77.

Moota Moola Project.—Masonry dam across the river, forming a reservoir to supply water to Poona, and irrigation to lands above and below. Partially completed; now supplies water to Poona and some irrigation; may be finished by 1878-79.

Krishna, Palkheir, Lakh, and Hathmuttee Canals.—Channels from rivers; all nearly completed.

Appendix, No. 3.

Sukkur, Mitrow, and Bigaree Canals.—All inundation canals in Sindh, the two first new; improvements are being made to the last, which has for some years supplied the station of Jacobabad, and the lands along its course with irrigation. The sanctioned work on all three is nearly completed.

BENGAL.

Soane Works.—The canal was formally opened in April last. The weir across the Soane is complete; the Arrah Branch and its distributaries are ready for the most part for the issue of water; the Patna and Buxar branches are in progress. Revised estimates for the completion of the project within certain limits are now under consideration. It is intended to push on the works to completion as rapidly as circumstances will allow. The portion of the project now in progress will probably be finished in 1880.

Orissa and Midnapoor.—These originally formed one project, but are for the present being worked separately, and have supplied irrigation to a limited extent for the last three or four years. The rivers Mahanuddee, Brahminee, and Byturnee supply the Orissa series, the Cossye that in the Midnapoor District. The limits to which the project should be carried out are now under consideration. In Orissa, the works in progress are the canals and distributaries in the central and northern deltas of the Mahanuddee, and the weirs and channels from the Brahminee and Byturnee. The work projected for the next few years is to complete these, and bring them into operation as rapidly as possible. In Midnapoor the work remaining to be done chiefly consists in completing the distributary system, drainage and river embankments.

Irrigation Works in Tirhoot.—Investigations are now being made to ascertain how far the wants of the tract in North Behar, which has suffered most from famine, can be supplied by small works, in connection with numerous petty streams intersecting it, as well as by inundation canals from the Gunduck.

NORTH WESTERN PROVINCES.

Ganges Canal.—Rectifications of existing works, and extensions and improvements to the distributary system are in progress. Most of these works can only be carried out slowly owing to the necessity of keeping the channels full to supply the irrigation. Some new works, such as weirs in the main channel, can only be built when the canal is closed, as it usually is, for about a month every year for periodical repairs.

Agra Canal.—This canal was opened in March 1874. The work remaining to be done chiefly consists in completing the distributary system, and the separate navigable lines connecting it with the cities of Muttra and Agra.

The Lower Ganges Canal.—This is a new work, is being pushed on as rapidly as possible, and will probably be ready for opening in 1878–79.

Irrigation Works in Bundelkund.—Estimates for one project consisting of a weir on the Betwa river and channels therefrom are now under consideration.

PUNJAB.

Western Jumna Canal.—Some of the new distributaries are in progress, and the new canal-channel in substitution for a portion of the existing Main Line and Delhi Branch is being commenced. The permanent weir across the Jumna River and head-works are well advanced, and may probably be completed in a year or two. It is intended to push on the other works as rapidly as the available supply of labour will admit.

Baree Doab Canal.—Permanent weir and head-works on the River Ravee are in operation; a small outlay only is required to complete them. The Kussoor and Sabraon branches are well advanced. These, with their distributary channels and the distributaries required to complete the system on the branches now open, will probably be completed by 1879–80. The rectification of the Main Canal is in progress, but is necessarily a slow process with a running canal.

Sirhind Canal.—These works are being pushed on as rapidly as possible. They will probably be sufficiently advanced by 1879–80 to allow of water being passed down the main channels and portions of the branches.

Swat River Canal.—This will irrigate a portion of the Peshawur Valley. The project has been drawn up and is now under consideration.

RAJPOOTANA.

Bheer Reservoir.—Is nearly completed. Irrigation has commenced therefrom.

ORDER.—Ordered, that this Resolution, with the tables referred to, be communicated to the Secretary of State, and that a copy be published in the Supplement to the "Gazette of India."

C. H. Dickens, Colonel, R.A.,
Secretary to the Government of India.

PUBLIC WORKS EXTRAORDINARY AND GUARANTEED RAILWAY FORECASTS, 1875-76.

CONTENTS.

GENERAL SUMMARY. PAGE

Forecast of Net Charge on the Revenues of India on account of Guaranteed Railways, and State Railways and Irrigation Works - 389

GUARANTEED RAILWAYS.

Statement No. I.—Estimated Capital and Interest Payments of Guaranteed Railways to end of 1879-80 - - - - - 390
Statement No. II.—Statement of Actual and Estimated Net Traffic Receipts of Guaranteed Railways as applied or to be applied in the Reduction of Charges for Guaranteed Interest - - - - - - - - - - - - - - - - 391
Statement No. III.—Approximate Statement of the Total Net Charge on the Revenues of India on account of Guaranteed Railways to end of 1879-80 - 392

STATE RAILWAYS.

No. I.—Statement of Actual and Proposed Outlay to end of 1879-80 on State Railways in India - - - - - - 393
No. II.—Statement of Actual and Estimated Net Traffic Receipts of State Railways from 1871-72 to end of 1879-80 - 394
No. III.—Approximate Statement of the Total Net Charge on the Revenues of India on account of State Railways for the period ending 1879-80 - 395

IRRIGATION WORKS.

No. I.—Statement of Actual and Proposed Outlay to end of 1879-80 on Irrigation Works in India - - - - - - 396
No. II.—Detailed Statement of the Actual and Estimated Net Direct Revenue of Irrigation Works in Bengal and Northern India for the 11 Years ending in 1879-80 - 400
No. III.—Detailed Statement of the Actual and Estimated Net Total Income derived from Irrigation Works in Bengal and Northern India for the 11 Years ending in 1879-80, including the Enhancement of Land Revenue due to the Works 401
No. IV.—Actual and Approximate Statement of the Total Net Charge to end of 1879-80, on the Revenues of India on account of Irrigation Works - 402

GENERAL SUMMARY.

FORECAST of Net Charge on the REVENUES of INDIA on account of GUARANTEED RAILWAYS, and STATE RAILWAYS and IRRIGATION WORKS classed as PUBLIC WORKS EXTRAORDINARY.

	ACTUALS.		ESTIMATE.					
	1872-73.	1873-74.	1874-75. (Regular Estimate).	1875-76 (Budget Estimate).	1876-77.	1877-78.	1878-79.	1879-80.
CHARGES.	£.	£.	£.	£.	£.	£.	£.	£.
Guaranteed Railways—Interest, land and control, &c.	4,819,457	4,820, 343	4,791,170	4,825,700	4,847,000	4,832,000	4,824,000	4,824,000
State Railways—Interest - -	141,733	249,256	399,535	535,179	638,679	755,265	876,765	998,265
Irrigation Works— „ - - -	232,590	286,530	343,141	401,641	460,141	518,641	577,141	635,641
	5,193,780	5,356,129	5,533,846	5,762,520	5,945,820	6,105,906	6,277,906	6,457,906
RECEIPTS.								
Guaranteed Railways - - -	2,547,900	3,230,554	3,561,000	3,141,700	3,351,000	3,390,000	3,511,000	3,609,000
State Railways - - - -	5,362	—6,474	38,100	74,356	169,000	258,000	349,000	430,000
Irrigation Works - - - -	282,822	351,216	369,041	367,070	414,900	435,600	454,700	479,100
	2,836,084	3,575,296	3,968,141	3,583,126	3,934,900	4,083,600	4,314,700	4,518,100
NET CHARGES.								
Guaranteed Railways - - -	2,271,557	1,589,789	1,230,170	1,684,000	1,496,000	1,442,000	1,313,000	1,215,000
State Railways - - - -	136,371	255,730	361,435	460,823	469,679	497,265	527,765	568,265
Irrigation Works - - - -	—50,232	—64,686	—25,900	34,571	45,241	83,041	122,441	156,541
	2,357,696	1,780,833	1,565,705	2,179,394	2,010,920	2,022,306	1,963,206	1,939,806

Note.—In the case of State Railways and Irrigation Works, the interest charges have been calculated only on such portion of the Capital outlay as represents expenditure charged or to be charged as Extraordinary.

Likewise in the case of the Guaranteed Railways no interest is charged on the State outlay, but only the guaranteed interest payable to the Companies, and the State outlay actually incurred.

GUARANTEED RAILWAYS.

STATEMENT No. I.—ESTIMATED CAPITAL and INTEREST PAYMENTS of GUARANTEED RAILWAYS to end of 1879-80.

ESTIMATE OF CAPITAL REQUIRED.

RAILWAY.	Length in Miles.	Probable Cost.	Capital raised to 31st March 1874.	ADDITIONAL CAPITAL TO BE RAISED IN THE YEARS						Total raised and to be raised.
				1874-75.	1875-76.	1876-77.	1877-78.	1878-79.	1879-80.	
		£.	£.	£.	£.	£.	£.	£.	£.	£.
East Indian, Main Line	1,503¾	30,700,000	30,785,000	610	- - -	- - -	- - -	- - -	- - -	30,785,610
„ Jubbulpoor Line										
Eastern Bengal	159¾	3,100,000	2,850,000	—161,700	416,400	- - -	- - -	- - -	- - -	3,104,700
Great Indian Peninsula	1,286	23,400,000	23,478,000	- - -	- - -	- - -	- - -	- - -	- - -	23,478,000
Bombay, Baroda, and Central India	407½	7,800,000	7,740,000	90,500	900	- - -	- - -	- - -	- - -	7,831,400
Madras	857¾	10,165,000	10,165,000	2,659	3,000	- - -	- - -	- - -	- - -	10,170,659
South Indian	619¾	3,600,000	3,659,000	—1,000	- - -	- - -	- - -	- - -	- - -	3,658,000
Sindh, Punjab, and Delhi	662	10,400,000	11,080,000	- - -	- - -	- - -	- - -	- - -	- - -	11,080,000
Oudh and Rohilkund	544	5,970,000	4,970,000	501,231	500,000	- - -	- - -	- - -	- - -	5,971,231
	6,040½	95,135,000	94,727,000	432,300	920,300	- - -	- - -	- - -	- - -	96,079,600

ESTIMATE OF CHARGES FOR GUARANTEED INTEREST.

	Actuals, 1872-73.	Actuals, 1873-74.	Regular Estimate, 1874-75.	Budget Estimate, 1875-76.	1876-77.	1877-78.	1878-79.	1879-80.
	£.	£.	£.	£.	£.	£.	£.	£.
Interest on capital to be paid up	- - -	- - -	- - -	- - -	45,000	—	—	—
Add,—Interest on capital already paid up	4,658,401	4,667,905	4,700,400	4,727,000	4,727,000	4,772,000	4,772,000	4,772,000
TOTAL Charge for Guaranteed Interest (*a*) £.	4,658,401	4,667,905	4,700,400	4,727,000	4,772,000	4,772,000	4,772,000	4,772,000

(*a*) The amounts include 49,983 *l.* on account of interest for the Madras Irrigation and Canal Company.

GUARANTEED RAILWAYS.

STATEMENT No. II.—STATEMENT of Actual and Estimated NET TRAFFIC RECEIPTS of GUARANTEED RAILWAYS, as applied, or to be applied, in the Reduction of Charges for Guaranteed Interest.

	ACTUALS.					ESTIMATES.					
	Net Receipts, 1869-70.	Net Receipts, 1870-71.	Net Receipts, 1871-72.	Net Receipts, 1872-73.	Net Receipts, 1873-74	Net Receipts, 1874-75 (Regular Estimate).	Net Receipts, 1875-76 (Budget Estimate).	Net Receipts, 1876-77.	Net Receipts, 1877-78.	Net Receipts, 1878-79.	Net Receipts, 1879-80.
	£.	£.	£.	£.	£.	£.	£.	£.	£.	£.	£.
East India, Main Line	1,545,564	1,446,098	1,447,476	1,416,052	1,762,556	1,879,200	1,604,000	1,604,000	1,630,000	1,670,000	1,690,000
„ Jubbulpoor Line	— 3,105*	15,642	30,429	108,297	100,250	137,000	96,000	96,000	96,000	96,000	96,000
Eastern Bengal	86,643	106,122	86,296	88,413	117,360	193,000	148,500	165,000	170,000	180,000	185,000
Great Indian Peninsula	437,442	611,338	830,653	602,306	651,324	759,000	779,000	785,000	795,000	800,000	805,000
Bombay, Baroda, and Central India	181,845	118,389	269,091	164,414	213,576	268,000	239,000	240,000	240,000	250,000	255,000
Madras	284,866	232,469	251,140	286,741	251,669	183,000	206,200	210,000	210,000	220,000	225,000
South Indian	25,753	29,671	25,407	44,624	44,138	38,000	82,000	96,000	108,000	130,000	150,000
Sindh, Punjab, and Delhi	188,220	92,894	— 20,214	— 88,549	148,649	426,000	110,000	145,000	150,000	155,000	158,000
Oudh and Rohilkund	5,241	— 30,873	11,503	10,466	35,543	80,000	90,000	150,000	170,000	200,000	250,000
	2,702,469	2,621,750	2,931,781	2,632,764	3,325,065	3,963,200	3,354,700	3,491,000	3,569,000	3,701,000	3,814,000
Less,—Moiety of Surplus Profits paid, or to be paid, to Railway Companies	74,530	65,047	54,628	78,279	83,876	392,000	202,500	140,000	179,000	190,000	205,000
	2,627,939	2,556,703	2,877,153	2,554,485	3,241,189	3,571,200	3,152,200	3,351,000	3,390,000	3,511,000	3,609,000
Madras Irrigation and Canal Company	1,003	74	— 8,205	— 6,585	— 10,635	— 10,200	— 10,500	—	—	—	—
Net Amount available to be applied in reduction of the Charge for Guaranteed Interest	2,628,942	2,556,777	2,868,948	2,547,900	3,230,554	3,561,000	3,141,700	3,351,000	3,390,000	3,511,000	3,609,000

* After deduction of 10,244 *l.*, being recovery effected in England on account of deficit in working of Jubbulpoor Line, East Indian Railway.

GUARANTEED RAILWAYS.

STATEMENT No. III.—APPROXIMATE STATEMENT of the Total Net Charge on the REVENUES of INDIA on account of GUARANTEED RAILWAYS to end of 1879-80.

	ACTUALS.		ESTIMATED SUMS FOR					
	1872-73.	1873-74.	1874-75 (Regular Estimate).	1875-76 (Budget Estimate).	1876-77.	1877-78.	1878-79.	1879-80.
	£.	£.	£.	£.	£.	£.	£.	£.
CHARGES ON THE STATE:—								
Interest on Total Capital - - - - -	4,658,401	4,667,905	4,700,400	4,727,000	4,772,000	4,772,000	4,772,000	4,772,000
Land and Control - - - - - -	161,056 { 110,081	152,438 { 87,987	90,770	98,700	75,000	60,000	52,000	52,000
Loss on Sale of Permanent way Materials and Carriage of same to Nizam's State Railway.	50,975	64,451	—	—	—	—	—	—
TOTAL GROSS CHARGE - - - - - -	4,819,457	4,820,343	4,791,170	4,825,700	4,847,000	4,832,000	4,824,000	4,824,000
NET RECEIPTS - - - - - - -	2,547,900	3,230,554	3,561,000	3,141,700	3,351,000	3,390,000	3,511,000	3,609,000
*NET CHARGE AGAINST REVENUE - - £.	2,271,557	1,589,789	1,230,170	1,684,000	1,496,000	1,442,000	1,313,000	1,215,000

No. I.—STATEMENT of Actual and Proposed OUTLAY to end of 1879-80 on STATE RAILWAYS in INDIA.

No.	NAME OF RAILWAY.	Length in Miles.	Probable Cost.	ACTUAL OUTLAY. To end of 1871-72.	ACTUAL OUTLAY. During 1872-73.	ACTUAL OUTLAY. During 1873-74.	ACTUAL OUTLAY. Total Outlay to end of 1873-74.	PROBABLE EXPENDITURE. 1874-75 (Regular Estimate).	1875-76 (Budget Estimate).	1876-77.	1877-78.	1878-79.	1879-80.	Total to end of 1879-80.	Item No.
	I.—SANCTIONED WORKS, including those Completed and in Progress:		£.	£.	£.	£.	£.	£.	£.	£.	£.	£.	£.	£.	
1	Calcutta and South-Eastern	28	A. 600,000	529,003	—7,423	—13,147	508,433	60,500	—35,000	- -	- -	- -	- -	553,983	1
2	Nulhattee	27½	A. 30,000	30,000	- -	—46	29,954	- -	- -	- -	- -	- -	- -	29,954	2
3	Punjab, Northern—Lahore to Jhelum	103	B. 2,300,000	745,103	368,643	282,478	1,396,224	335,000	470,000	98,776	- -	- -	- -	2,300,000	3
4	Indus Valley	498	B. 5,000,000	122,086	210,869	653,949	986,904	771,400	970,000	1,000,000	800,000	371,696	- -	5,000,000	4
5	Rajpootana (Delhi Division)	142	780,000	172,348	143,499	248,311	564,158	185,000	210,000	39,250	- -	- -	- -	2,280,000	5
6	„ (Agra „)	254	1,500,000	113,348	266,093	422,151	801,592	480,000							6
7	Wardha Valley	46	400,000	6,686	100,560	30,565	137,811	70,000	90,000	90,000	12,189	- -	- -	400,000	7
8	Holkar	85½	1,000,000	36,327	186,328	298,997	521,652	278,600	180,000	19,748	- -	- -	- -	1,000,000	8
9	Nimach—Indore to Nimach	169	1,100,000	31,691	13,089	126,343	171,123	200,000	180,000	195,000	244,375	109,502	- -	1,100,000	9
10	Tirhoot—Chumpta Ghât to Durbunga	50	270,000	- -	- -	(a) 97,867	97,867	164,000	- -	- -	- -	- -	- -	261,867	10
11	Northern Bengal	225	1,400,000	5,269	10,774	30,487	46,530	385,000	280,000	315,000	250,000	123,470	- -	1,400,000	11
12	Burmah (Rangoon and Irrawaddi Valley)	161	900,000	2,674	681	- -	3,355	130,000	430,000	270,000	66,645	- -	- -	900,000	12
13	Scindia—Agra to Gwalior	72	B. 1,000,000	- -	1,624	7,967	9,591	12,500	100,000	250,000	350,000	250,000	27,909	1,000,000	13
14	Tirhoot Branch from Tajpoor to Mozufferpoor, and Extension to Mokameh Ghât	60	B. 500,000	- -	- -	- -	- -	10,000	90,000	250,000	150,000	- -	- -	500,000	14
	TOTAL I.	1,921	16,780,000	1,794,535	1,294,737	2,185,022	5,275,194	3,102,050	2,965,000	2,527,774	1,973,209	854,668	27,909	16,725,804	
	II.—WORKS under consideration, and for which Estimates have been prepared, but which have not yet been sanctioned:														
15	Nagpur and Chatisgurh	130	800,000												15
16	Nimach—Nimach to Nusseerabad	134	800,000												16
17	Mahratta (Carwar and Bellary)	264	1,600,000												17
	TOTAL II.	528	3,200,000	34,166	22,488	27,129	83,783	12,570	(b) 45,000	172,226	726,791	1,845,332	2,672,091	5,557,793	
	III.—WORKS proposed and under Survey:														
18	Northern Punjab—Jhelum to Peshawur	170	- -												18
19	Western Rajpootana	300	- -												19
20	Tirhoot (Extensions)	-	- -												20
	TOTAL III.	470													
	IV.—Suspense (Stores undistributed)	-	- -	21,549	110,417	168,010	299,967	—133,000	- -	- -	- -	- -	- -	166,967	
	GRAND TOTAL	-	- -	1,850,241	1,427,642	2,381,061	5,658,944	2,981,620	3,010,000	2,700,000	2,700,000	2,700,000	2,700,000	22,450,561	
	Less,—Met from Ordinary Grant	-	- -	12,890	13,993	26,436	52,819	204,070	10,000	- -	- -	- -	- -	266,889	
	Net Charge Extraordinary	-	- -	1,837,851	1,413,649	2,354,625	5,606,125	2,777,550	3,000,000	2,700,000	2,700,000	2,700,000	2,700,000	22,183,675	

A.—Actual Cost. The outlay does not include the following sums, charged as ordinary expenditure:—
Purchase of land and control - - £. 108,500.
Loss by exchange - - - - - 30,000.

B.—Probable cost is entered approximately.

(a)—Exclusive of 23,228 *l.* debitable to Famine Relief.
(b)—Of this sum, 35,000 *l.* is reduction of the capital of No. 1 Railway, and 10,000 *l.* is deducted at foot as chargeable to Ordinary.

STATE RAILWAYS.

No. II.—STATEMENT of Actual and Estimated NET TRAFFIC RECEIPTS of STATE RAILWAYS from 1871-72 to end of 1879-80.

NAME OF RAILWAYS.	ACTUALS.			ESTIMATED.					
	Net Receipts, 1871-72.	Net Receipts, 1872-73.	Net Receipts, 1873-74,	Net Receipts, 1874-75. (Regular Estimate.)	Net Receipts, 1875-76. (Budget Estimate.)	Net Receipts, 1876-77.	Net Receipts, 1877-78.	Net Receipts, 1878-79.	Net Receipts, 1879-80.
	£.	£.	£.	£.	£.	£.	£.	£.	£.
Calcutta and South-Eastern State Railway -	4,064	1,262	—10,197*	1,800	200	1,000	1,000	1,000	1,000
Nulhattee State Railway - - - - -	- -	4,100	3,282	2,480	2,556	3,000	3,000	3,000	3,000
Rajpootana State Railway (Delhi District) -	- -	- -	141	28,420	60,000	25,000	28,400	38,000	48,000
Ditto - - - ditto (Agra Ditto) -	- -	- -	- -			51,000	60,850	76,000	85,000
Punjab Northern State Railway - - -	- -	- -	- -	- -	3,000	15,000	16,500	17,000	18,000
Indus Valley State Railway - - - - -	- -	- -	- -	- -	- -	20,000	43,900	62,000	72,000
Wardha Valley State Railway - - -	- -	- -	- -	600	2,000	8,000	10,000	15,000	20,000
Holkar State Railway - - - - - -	- -	- -	300	4,800	6,600	12,000	14,750	17,000	20,000
Nimach State Railway - - - - - -	- -	- -	- -	- -	- -	8,000	15,000	20,000	25,000
Northern Bengal State Railway - - -	- -	- -	- -	- -	- -	9,000	24,000	40,000	56,000
Rangoon and Irrawaddi Valley - - -	- -	- -	- -	- -	- -	9,000	18,000	30,000	42,000
Scindia - - - - - - - - -	- -	- -	- -	- -	- -	1,000	7,500	10,000	15,000
Tirhoot and other Railways - - - -	- -	- -	- -	- -	- -	7,000	15,100	20,000	25,000
TOTAL - - - £.	4,064	5,362	—6,474	38,100	74,356	169,000	258,000	349,000	430,000

* Includes Transfer from Capital to Revenue of value of stock in hand at debit of Capital.

STATE RAILWAYS.

No. III.—APPROXIMATE STATEMENT of the Total Net Charge on the REVENUES of INDIA on account of STATE RAILWAYS for the Period ending 1879-80.

	Actuals to End of March 1872.	ACTUALS.		ESTIMATED.					
		1872-73.	1873-74.	1874-75.	1875-76.	1876-77.	1877-78.	1878-79.	1879-80.
LOAN at 4½ per Cent.	£.	£.	£.	£.	£.	£.	£.	£.	£,
Capital outlay in each year - - -	1,837,851	1,413,649	2,354,625	2,777,550	3,000,000	2,700,000	2,700,000	2,700,000	2,700,000
Less,—Provided by His Highness Maharaja Holkar at 4½ - - - - - -	450,000	110,000	110,000	110,000	110,000	110,000	—	—	—
	1,387,851	1,303,649	2,244,625	2,667,550	2,890,000	2,590,000	2,700,000	2,700,000	2,700,000
Add.—Amount provided in excess of probable outlay of year by His Highness Maharaja Scindia - -	- -	- -	- -	550,000	—	—	—	—	—
Deduct—Amount of grant of year provided from His Highness Maharaja Scindia's balance - -	- -	- -	- -	- -	40,819	400,000	109,181	—	—
	1,387,851	1,303,649	2,244,625	3,217,550	2,849,181	2,190,000	2,590,819	2,700,000	2,700,000
Total to end of each year - - - -	- -	2,691,500	4,936,125	8,153,675	11,002,856	13,192,856	15,783,675	18,483,675	21,183,675
Interest charge - - - - - -	- -	121,118	222,126	366,915	495,129	593,679	710,265	831,765	953,265
LOAN from His Highness Maharaja Holkar at 4½ per Cent.									
Capital outlay in each year - - -	450,000	110,000	110,000	110,000	110,000	110,000	—	—	—
Total to end of each year - - - -	- -	560,000	670,000	780,000	890,000	1,000,000	1,000,000	1,000,000	1,000,000
Interest charge - - - - - -	- -	(*a*) 20,615	(*b*) 27,130	32,620	40,050	45,000	45,000	45,000	45,000
RESULT.									
Total interest charge - - - - -	- -	141,733	249,256	399,535	535,179	638,679	755,265	876,765	998,265
Estimated net earnings as per Statement No. II. - - - - - - -	- -	5,362	—6,474	38,100	74,356	169,000	258,000	349,000	430,000
Net charge on Revenue - - - -	- -	136,371	255,730	361,435	460,823	469,679	497,265	527,765	568,265
Estimated mileage open - - - -	55	55	120	402	823	1,225	1,622	1,997	2,372

(*a*) (*b*)—Actual charge.

IRRIGATION WORKS - - - - - -

No. I.—STATEMENT of Actual and Proposed OUTLAY to end of

Item No.	PROJECTS.	Probable Cost.	ACTUAL OUTLAY.			
			To end of 1871-72.	During 1872-73.	During 1873-74.	Total to end of 1873-74.
	(I.)	£.	£.	£.	£.	£.
	WORKS THAT HAVE BEEN SANCTIONED, INCLUDING THOSE COMPLETED AND IN PROGRESS.					
	MADRAS.					
1	Extension of irrigation, and additions and improvements to existing works in the Eastern and Western Deltas of the Godavery - -	369,000	81,000	31,436	27,170	139,606
2	Works in connection with the Kistna Delta -	167,000	94,471	10,909	11,222	116,602
3	Ditto - ditto - Pennair Delta - -	66,000	43,195	2,438	2,965	48,598
4	Anicut across the Vellaur River - - -	29,000	9,040	6,977	6,830	22,847
5	Improvements and other works connected with the Cauvery Delta - - - - - -	44,000	31,692	5,712	3,170	40,574
6	Streeviguntum Anicut Project - - -	120,000	73,420	18,546	7,483	99,449
	BOMBAY.					
7	Ekrookh Tank, and Mookti Reservoir - -	151,000	135,123	1,362	2,731	139,216
8	Moota Moola Project - - - - - -	493,000	260,212	56,193	44,592	360,997
9	Kristna Canal, Palkheir Canal, Lakh Canal, and Hathmuttee Canal - - - - -	106,000	66,139	12,651	8,345	87,135
10	Sukkur and Shadadpoor Canals, Mitrow Canal, and improvements to Bigaree Canal (Sindh).	144,000	76,157	14,508	18,521	109,186
	BENGAL.					
11	Soane Project - - - - - - - -	(c) 2,710,000	438,915	245,604	293,200	977,719
12	Orissa and Midnapoor Project - - -	(a) 2,850,000	1,656,788	201,815	219,409	2,078,012
	NORTH-WESTERN PROVINCES.					
13	Remodelling and extensions of the Ganges Canal - - - - - - - - -	895,000	218,054	40,611	43,280	301,945
14	Agra Canal - - - - - - - - -	(c) 757,000	302,307	117,952	118,978	539,237
15	Lower Ganges Canal - - - - - -	(b) 2,053,000	12,087	42,352	264,347	318,786
	PUNJAB.					
16	Improvements and extensions of the Western Jumna Canal - - - - - - - -	756,000	70,156	10,289	22,383	102,828
17	Improvements and extensions of the Baree Doab Canal - - - - - - - -	480,000	158,143	34,371	29,142	221,656
18	Sirhind Canal - - - - - - - -	(b) 3,087,000	405,045	192,817	137,114	734,976
	RAJPOOTANA.					
19	Bheer Reservoir - - - - - - - -	20,000	1,629	9,190	5,443	16,262
	TOTAL (I.) - - - £.	15,297,000	4,133,573	1,055,733	1,266,325	6,455,631

(a)—Complete estimates for these works have not been sanctioned by Secretary of State, and the amounts set down as probable cost are liable to alteration.
(b)—Includes provision for increased establishment, in addition to amount sanctioned by Secretary of State.
(c)—This is the amount of revised estimate still to be sanctioned.

- - - - - - - IRRIGATION WORKS.

1879-80, on IRRIGATION WORKS in INDIA.

PROBABLE OUTLAY.						Total Outlay to end of 1879-80.	Deduct, met from Contributions.	Balance Outlay to end of 1879-80.	Item No.
1874-75. (Regular Estimate.)	1875-76. (Budget Estimate.)	1876-77.	1877-78.	1878-79.	1879-80.				
£.	£.	£.	£.	£.	£.	£.	£.	£.	
46,282	46,860	40,000	40,000	37,000	19,252	369,000	- -	369,000	1
13,528	12,288	13,000	11,582	- -	- -	167,000	- -	167,000	2
5,820	2,312	4,000	4,000	1,370	- -	66,100	- -	66,100	3
1,450	2,540	1,163	- -	- -	- -	28,000	- -	28,000	4
2,060	- -	1,366	- -	- -	- -	44,000	- -	44,000	5
5,560	5,000	5,000	4,991	- -	- -	120,000	- -	120,000	6
7,525	5,106	- -	- -	- -	- -	151,847	- -	151,847	7
33,550	47,841	22,000	10,000	18,612	- -	493,000	- -	493,000	8
11,895	7,675	- -	- -	- -	- -	106,705	- -	106,705	9
20,380	14,378	- -	- -	- -	- -	143,944	- -	143,944	10
318,225	255,037	240,000	240,000	240,000	240,000	2,510,981	- -	2,510,981	11
202,397	170,963	150,000	150,000	100,000	- -	2,851,372	- -	2,851,372	12
33,677	59,668	80,000	80,000	80,000	80,000	715,290	- -	715,290	13
101,085	87,012	20,000	- -	- -	- -	747,334	- -	747,334	14
242,137	303,320	260,000	260,000	260,000	260,000	1,904,243	- -	1,904,243	15
39,176	78,160	75,000	75,000	75,000	75,000	520,164	- -	520,164	16
40,000	50,000	50,000	50,000	50,000	18,344	480,000	- -	480,000	17
210,000	246,840	250,000	250,000	250,000	250,000	2,191,816	814,493	1,377,323	18
2,000	- -	- -	- -	- -	- -	18,262	- -	18,262	19
1,336,747	1,395,000	1,211,529	1,175,573	1,111,982	942,596	13,629,058	814,493	12,814,565	

No. I.—STATEMENT of Actual and Proposed Outlay to end of

Item No.	PROJECTS.	Probable Cost.	ACTUAL OUTLAY. To end of 1871-72.	During 1872-73.	During 1873-74.	Total to end of 1873-74.
		£.	£.	£.	£.	£.
	Brought forward - - -	- -	4,133,573	1,055,733	1,266,325	6,455,631
	(II.)					
	WORKS UNDER CONSIDERATION, AND FOR WHICH ESTIMATES HAVE BEEN PREPARED, BUT WHICH HAVE NOT YET BEEN SANCTIONED.					
20	Extension of works in Central Delta of Godavery - - - - - - - - -	100,000				
21	Kistna Delta, New Works in - - - -	130,000				
22	Canals in Bundelkhund, Betwa project - -	302,000				
23	Swat River Canal - - - - - - -	167,000				
		699,000				
	(III.)		54,977	15,747	2,718	73,442
	WORKS PROPOSED AND UNDER SURVEY.					
24	Further Works in Extension of Canals in Sindh - - - - - - - - -	- -				
25	Canals in Tirhoot - - - - - - - -	- -				
26	Derajat Canals - - - - - - - -	- -				
	TOTAL - - - £.	- -	4,188,550	1,071,480	1,269,043	6,529,073
	Less met from Contributions (*a*) -	- -	4,917	200,630	48,946	254,493
		—	4,183,633	870,850	1,220,097	6,274,580
	OUTLAY provisionally classed as Extraordinary on certain Works, the Expenditure on which has been refunded, or will be refunded, from Ordinary Grant - - - - - - -	- -	214,129	—99,931	—21,415	92,783
	GRAND TOTAL - - - £.	- -	4,397,762	770,919	1,198,682	6,367,363

NOTE.—In the case of Madras and Bombay specially, and in other Provinces generally, the outlay incurred from the Ordinary grant on the ordinary. The probable cost shown above does not include charges for simple interest while work is under construction, or leave and pension are omitted, because they are defrayed from Ordinary Funds.

(*a*)—Represents outlay from contributions given for the construction of the Sirhind Canal by His Highness the Maharaja of Puttiala, His

1879–80, on Irrigation Works in India—*continued.*

PROBABLE OUTLAY.						Total Outlay to end of 1879–80.	Deduct, met from Contributions.	Balance Outlay to end of 1879–80.	Item No.
1874–75. (Regular Estimate.)	1875–76. (Budget Estimate.)	1876–77.	1877–78.	1878–79.	1879–80.				
£.	£.	£.	£.	£.	£.	£.	£.	£.	
1,336,747	1,395,000	1,211,529	1,175,573	1,111,982	942,596	13,629,058	814,493	12,814,565	
11,253	- -	202,471	238,427	302,018	471,404	1,299,015	- -	1,299,015	
1,348,000	1,395,000	1,414,000	1,414,000	1,414,000	1,414,000	14,928,073	814,493	14,113,580	
80,000	80,000	100,000	100,000	100,000	100,000	814,493	—	—	
1,268,000	1,315,000	1,314,000	1,314,000	1,314,000	1,314,000	14,113,580	—	—	
—10,000	—15,000	—14,000	—14,000	—14,000	—14,000	11,783	—	—	
1,258,000	1,300,000	1,300,000	1,300,000	1,300,000	1,300,000	14,125,363	—	—	

works enumerated above, has been deducted from the probable cost of the projects, and the balance shown as amount chargeable as Extra-allowances, or capitalization of abatement of land revenue, or charge by exchange on payments in England. The amounts of these several charges

Highness the Raja of Jheend, and His Highness the Raja of Nabha.

IRRIGATION WORKS.

No. II.—Detailed Statement of the Actual and Estimated Net Direct Revenue of Irrigation Works in Bengal and Northern India for the Eleven Years ending in 1879-80.

This Table excludes the Receipts due to Irrigation Works included in the Civil Accounts as a Portion of the Land Revenue.

[The Revenue in Madras and Bombay, including Sindh, is excluded for want of reliable Separation of Land Revenue from Water Rates.]

WORKS.	Net Actual Direct Receipts.					Net Estimated Direct Receipts.					
	1869-70.	1870-71.	1871-72.	1872-73.	1873-74.	1874-75 (Regular Estimate).	1875-76 (Budget Estimate).	1876-77.	1877-78.	1878-79.	1879-80.
NET DIRECT REVENUE.	£.	£.	£.	£.	£.	£.	£.	£.	£.	£.	£.
Bengal:											
Orissa Scheme— Midnapoor Canal	613	—5,975	—2,876	—3,573	—5,792	—1,441	—2,059	—1,300	200	2,200	3,000
Tidal Canal	129	—167	—1,444	583	–	3,113	3,747	4,000	4,000	4,000	5,000
Orissa Project	121	—587	—18,199	—20,138	—8,536	—14,121	—15,852	—22,000	—22,000	21,000	—18,000
Soane Scheme	–	–	–	–	–	–	—3,948	—8,000	—10,000	—6,000	–
Total £.	863	—6,729	—22,519	—23,128	—14,328	—12,449	—19,012	—27,300	—27,800	—20,800	—10,000
North Western Provinces:											
Ganges Canal	164,577	90,943	91,540	60,122	94,631	109,430	106,658	115,000	115,000	115,000	125,000
Eastern Jumna Canal	49,221	42,008	31,146	34,335	35,355	37,690	38,105	33,800	33,900	34,300	34,300
Doon Canals	1,973	1,404	2,086	2,286	2,494	2,395	1,775	2,550	2,850	2,950	2,950
Rohilkhund Canals	400	—2,146	—848	—2,694	—2,737	—3,487	791	450	11,150	11,350	11,550
Bundelkhund Works	—731	—389	—305	—328	—478	—458	—1,268	—600	—600	—600	—600
Agra Canal	–	–	–	–	–	—3,700	—260	—10,200	—6,300	—3,000	–
Lower Ganges Canal	–	–	–	–	–	–	–	–	–	–	–
Total £.	215,440	131,820	123,619	93,721	129,265	141,870	145,801	141,000	156,000	160,000	173,200
Punjab:											
Western Jumna Canal	74,405	116,884	71,651	62,182	63,032	65,720	61,299	70,000	70,000	70,000	70,000
Goorgaon Irrigation Works	—1,041	—1,304	—618	—658	—865	—1,366	—1,058	—500	—500	—500	—500
Baree Doab Canal	40,443	21,705	36,700	49,431	32,248	34,310	39,211	36,000	38,000	42,000	46,000
Lower Sutlej Canal	—3,392	—3,406	—3,792	—3,424	—4,252	—5,214	—4,987	—4,500	—4,500	—4,500	—4,500
Upper „ „	—2,671	—3,393	—10,229	—9,162	—4,315	—3,532	—175	700	700	700	700
Indus Inundation Canals	—8,847	—11,656	—3,494	—20,623	—8,313	—13,880	—15,384	—11,200	—11,200	—11,200	—11,200
Shahpoor Canal	–	—22	146	275	129	250	312	500	500	500	500
Sirhind „	–	–	–	–	–	–	–	–	–	–	–
Total £.	98,897	118,808	90,364	78,021	77,664	76,288	79,218	91,000	93,000	97,000	101,000
GRAND TOTAL £.	315,200	243,899	191,464	148,614	192,601	205,709	206,007	204,700	221,200	236,200	264,200

Note.—This statement shows only the net direct receipts derived, and likely to be derived, from the several works for the period stated. Such receipts are of water-rates, as included in the Public Works Accounts, and Miscellaneous Receipts, such as tolls, rents, fines, &c., as included in the same accounts. The portion of the land revenue due to Irrigation Works, and included in the Civil Accounts as Land Revenue, is added to get the total income as shown in Return No. III.

IRRIGATION WORKS.

No. III.—DETAILED STATEMENT of the Actual and Estimated NET TOTAL INCOME derived from IRRIGATION WORKS in BENGAL and NORTHERN INDIA for the 11 Years ending in 1879-80, including the Enhancement of Land Revenue due to the Works.

[The Revenue in Madras and Bombay, including Sindh, is excluded, *see* previous page.]

WORKS.	ACTUAL NET DIRECT AND INDIRECT RECEIPTS.					ESTIMATED NET DIRECT AND INDIRECT RECEIPTS.					
	1869-70.	1870-71.	1871-72.	1872-73.	1873-74.	1874-75.	1875-76.	1876-77.	1877-78.	1878-79.	1879-80.
	£.	£.	£.	£.	£.	£.	£.	£.	£.	£.	£.
NET DIRECT AND INDIRECT REVENUE.											
BENGAL.											
Orissa Scheme:											
Midnapoor Canal - - -	613	—5,975	—2,876	—3,573	—5,792	—1,441	—2,959	—1,300	200	2,200	3,000
Tidal Canal - - - -	129	—167	—1,444	583	-	3,113	3,747	4,000	4,000	4,000	5,000
Orissa Works - - -	121	—587	—18,199	—20,138	—8,536	—14,121	—15,852	—22,000	—22,000	—21,000	—18,000
Soane Scheme - - - - -	-	-	-	-	-	-	—3,948	—8,000	—10,000	—6,000	-
TOTAL - - £.	863	—6,729	—22,519	—23,128	—14,328	—12,449	—19,012	—27,300	—27,800	—20,800	—10,000
NORTH-WESTERN PROVINCES:											
Ganges Canal - - - -	182,925	111,241	114,474	87,790	129,058	147,600	144,828	185,000	185,000	190,000	198,000
Eastern Jumna Canal - - -	66,990	59,777	48,915	46,642	52,343	54,679	55,094	51,800	51,900	52,300	52,300
Doon Canals - - - -	2,448	1,879	2,561	2,761	2,969	2,870	2,250	4,250	4,550	4,650	4,650
Rohilkhund Canals - - -	400	—2,146	503	567	523	—225	4,053	3,650	17,150	17,350	17,550
Bundelkhund Works - - -	—481	—134	—50	—73	—223	—204	—1,014	—400	—400	—400	-
Agra Canal - - - - -	-	-	-	-	-	—3,700	—260	—8,700	—3,400	—1,000	-
Lower Ganges Canal - - -	-	-	-	-	-	-	-	-	-	-	-
TOTAL - - £.	252,282	170,617	166,403	137,687	184,670	201,020	204,951	235,600	254,800	262,900	272,500
PUNJAB:											
Western Jumna Canal - -	111,661	154,140	108,907	99,438	100,288	102,976	97,497	107,200	107,200	107,200	107,200
Goorgaon Irrigation Works - -	1,412	1,149	1,835	1,795	1,588	1,087		1,900	1,900	1,900	1,900
Baree Doab Canal - - -	60,946	47,848	61,741	67,749	51,093	54,310	59,211	61,000	63,000	67,000	71,000
Lower Sutlej Canals - - -	17,938	17,924	17,538	17,906	17,078	16,116	16,343	16,800	16,800	16,800	16,800
Upper Sutlej Canals - - -	120	—602	—7,438	—6,371	2,039	2,827	6,180	13,400	13,400	13,400	13,400
Indus Inundation Canals - -	—753	—3,562	4,600	12,529	8,659	2,904	1,588	5,800	5,800	5,800	5,800
Shahpoor Canal - - - -	-	—22	146	275	129	250	312	500	500	500	500
Sirhind Canal - - - -	-	-	-	-	-	-	-	-	-	-	-
TOTAL - - £.	191,324	216,875	187,929	168,263	180,874	180,470	181,131	2 06,600	208,600	212,600	216,600
GRAND TOTAL - - £.	444,469	380,763	331,213	282,822	351,216	369,041	367,070	414,900	435,600	454,700	479,100

IRRIGATION WORKS.

No. IV.—Actual and Approximate Statement of the Total Net Charge to end of 1879-80 on the Revenues of India on account of Irrigation Works.

	ACTUALS.			ESTIMATE.					
	1871-72.	1872-73.	1873-74.	1874-75.	1875-76.	1876-77.	1877-78.	1878-79.	1879-80.
Capital Outlay.	£.	£.	£.	£.	£.	£.	£.	£.	£.
Capital outlay in all Provinces—									
During year - - -	(a)4,397,762	770,919	1,198,682	1,258,000	1,300,000	1,300,000	1,300,000	1,300,000	1,300,000
To end of year - - -	- -	5,168,681	6,367,363	7,625,363	8,925,363	10,225,363	11,525,363	12,825,363	14,125,363
Interest Charges and Net Revenue.									
Interest Charges at 4½ per cent. -	197,898	232,590	286,530	343,141	401,641	460,141	518,641	577,141	635,641
Net Revenue—									
Deduct net total earnings in Bengal, the North Western Provinces, and the Punjab (excluding Madras, Bombay and Ajmere), *vide* Statement No. III. - -	331,213	282,822	351,216	369,041	367,070	414,900	435,600	454,700	479,100
Balance Net Revenue or Loss - - - £.	133,315	50,232	64,686	25,900	—34,571	—45,241	—83,041	—122,441	—156,541

(a) To end of 1871-72.

MEMORANDUM on the Revised Forecast of Charges and Receipts from Guaranteed Railways, and State Railways and Irrigation Works.

The actual outlay in 1873-74 on State Railways and Irrigation Works compares with the original Budget Grants, assumed in the Forecast of 1873, as follows:—

	Forecast of 1873.	Actuals.	Difference.
	£.	£.	£.
State Railways - - - - - -	2,612,000	2,354,625	257,375
Irrigation - - - - - - -	1,266,000	1,198,682	67,318
Total, excluding Contributions, £.	3,878,000	3,553,307	324,693

The expenditure has been less than the grants by 8·4 per cent.

For

For 1874-75 the corresponding figures are:—

	Forecast of 1873.	Regular Estimate.	Difference.
	£.	£.	£.
State Railways - - - - - -	3,088,050	2,777,550	310,500
Irrigation - - - - - - -	1,475,000	1,258,000	217,000
TOTAL - - - £.	4,563,050	4,035,550	527,500

The Regular Estimate is 11·5 per cent. less than the Forecast of 1873.

GUARANTEED RAILWAYS.

2. In comparing the portion of the Forecast of 1873 which relates to the earnings of the Guaranteed Railways with the similar tables of this year, the first point to be noticed is the effect of the famine, which greatly increased the grain traffic and the Railway Companies' earnings. This considerably reduced the net charge for guaranteed interest in the years 1873-74 and 1874-75; but at the same time it has not in the same degree helped the general finances, because the Government (taking, for example, the East Indian Railway rates) agreed to pay the Railway Companies the difference between the reduced rate of $\frac{1}{8}$ pie per maund per mile and the normal charge for the carriage of grain, viz., 22 pies per 100 maunds per mile, upon all grain carried towards the famine districts. The actual payments made on this account amount to 457,000 *l.*

Comparing the estimates given in the Forecast of 1873, with the actual receipts for 1873-74, and the Regular Estimate for 1874-75, the result is:—

	£.	£.
Net traffic earnings for 1873-74, according to Forecast - - -	2,900,000	
Actuals - - - - - - - - - - - -	3,230,554	
Excess - - - -	- -	330,554
Net traffic earnings, 1874-75, according to Forecast - - -	3,170,000	
Regular Estimate - - - - - - - - - - -	3,561,000	
Excess - - - -	- -	391,000
TOTAL Excess - - - £.		721,554

The closest calculation that can be made shows that about 390,000 *l.* of this increase was due to the famine relief traffic, and that the balance of 331,554 *l.* would have been realised in excess of the Forecast during the two years without the relief traffic.

3. The capital accounts have next to be noticed. The Forecast tables of 1873 were imperfect in this particular, but the defect was unfavourable to the Forecast. The defect was that the capital was taken as paid up from year to year as required, whereas the greater part had been paid up in anticipation. Thus the Forecast over-estimated the future increase of charge to the State, inasmuch as it did not take into account the whole of the charge for the year 1872-73, with which the comparison was made.

4. The interest on capital paid up according to the two sets of tables is as follows:—

	Old Tables.	New Tables.
	£.	£.
1872-73 - - - -	4,549,750	4,658,401
1873-74 - - - -	4,626,000	4,667,905
1874-75 - - - -	4,726,000	4,700,400
1875-76 - - - -	4,767,250	4,727,000
1876-77 - - - -	4,787,250	4,772,000
1877-78 - - - -	4,797,250	4,772,000
1878-79 - - - -	- -	4,772,000
1879-80 - - - -	- -	4,772,000

So that the increase of charge to the State from 1872-73 to 1877-78 is represented in the

Appendix, No. 3.

the old tables as 247,500 *l.*, and in the new as 113,599 *l.* Or, if it be taken from 1873–74 to 1877–78, it is by the old tables 171,250 *l.*, and by the new, 104,095 *l.*

5. In regard to the items composing the Capital Account, it is to be noticed, first, that the line from Beypoor to Cannanore, on the Madras Railway, is omitted, as the project has been given up, and 485,000 *l.* is thus reduced; and next, that the Arconum and Conjeveram Branch of the Carnatic Company is omitted. The mileage and capital are throughout corrected according to the later estimates. On the whole, the Forecast of 1873–74 provided for an estimated expenditure on Guaranteed Railways of 95,945,000 *l.*, which is reduced in the present Forecast to 95,135,000 *l.*

6. Some difference will be perceived in the estimate for Land and Control. The figures are as follows:—

	Old Tables.	New Tables.
	£.	£.
1872-73	129,850	161,056
1873-74	110,200	152,438
1874-75	75,000	90,770
1875-76	70,000	98,700
1876-77	70,000	75,000
1877-78	70,000	60,000
1878-79	Not estimated	52,000
1879-80	Not estimated	52,000

In the case of the first two years the difference is due to the inclusion as a special charge under this head of the amount which Government have agreed to bear on account of the losses on the sale of permanent-way materials, and the carriage of the same to the Nizam's State Railway.

7. It will be seen that the net earnings are estimated in greater detail than before, being separately estimated for each line. Comparing the new Forecast with that of 1873, the result is as follows:—

YEARS.	Net Earnings of Guaranteed Railways, according to the Forecasts of—	
	1875.	1873.
	£.	£.
1872-73	2,547,900	2,470,000
1873-74	3,230,554	2,900,000
1874-75	3,561,000	3,170,000
1875-76	3,141,700	3,270,000
1876-77	3,351,000	3,370,000
1877-78	3,390,000	3,470,000
1878-79	3,511,000	Not estimated.
1879-80	3,609,000	„

8. In the case of the years 1873–74 and 1874–75, the difference is due to the exceptional earnings on account of the famine already referred to. In the other years the receipts are purposely set down at lower amounts than in the previous Forecast, in order to provide for contingencies.

These are the only points in the Guaranteed Railway Forecast Tables which seem to require notice.

9. Compared with the Forecast Tables of 1873, the results are:—

YEARS.	Net Charge against Revenue, on account of Guaranteed Railways, according to Forecasts of—	
	1875.	1873.
	£.	£.
1872-73	2,271,557	2,209,600
1873-74	1,589,789	1,836,200
1874-75	1,230,170	1,631,000
1875-76	1,684,000	1,567,250
1876-77	1,496,000	1,487,250
1877-78	1,442,000	1,397,250
1878-79	1,313,000	Not estimated.
1879-80	1,215,000	„

10. It

10. It may be noted that, as the interest on the guaranteed capital of the Madras Irrigation and Canal Company is treated in the Finance Accounts as a portion of the charges for Guaranteed Railways, the operations of the Company are also included in the Forecast of 1875 under the same head. The amounts included are as follows:— Appendix, No. 3.

	Guaranteed Interest.	Loss on Working.
	£.	£.
1872–73	49,983	6,585
1873–74	49,983	10,635
1874–75	49,983	10,200
1875–76	49,983	10,500
1876–77	49,983	—
1877–78	49,983	—
1878–79	49,983	—
1879–80	49,983	—

11. From 1876–77 no amount has been set down for deficits in the working of the Company, as it is hoped the receipts will cover the working expenses.

State Railways.

12. The total sum set down in the Forecast of 1873 as the estimated cost of State Railways sanctioned and under consideration, was 19,734,000 *l.*

In the present Forecast the amount is:—

	£.
Sanctioned works	16,780,000
Works under consideration	3,200,000
Total £.	19,980,000

The difference of 246,000 *l.* is made up as follows:—

	£.	£.
Line from Jhelum to Rawulpindee omitted for want of estimates for broad gauge off Trunk Road	475,000	
Western Rajpootana omitted for want of complete estimates	1,650,000	
Line from Puttamby to Cochin, given up	600,000	
		2,725,000
Increased cost of broad gauge with light rails, and transfer of line to separate bank in Punjab Northern Railway	450,000	
Increased cost of broad gauge for Indus Valley	1,680,000	
	2,130,000	
Less provision for third rail on Sindh, Punjab, and Delhi Railway	345,000	
		1,785,000
Increased cost on account of broad gauge for Sindia Railway		250,000
Approximate cost, Tirhoot Railway		250,000
Ditto of Tirhoot Branch		500,000
Debentures of Calcutta and South Eastern Railway, less probable sales of stock		71,000
Minor changes in probable cost as inserted in previous Forecast		115,000
		2,971,000
Difference £.		246,000

13. It will be observed that, except in the case of the lines affected by the gauge question, there is a very small increase (115,000 *l.*) in the sum set down as the probable cost of lines inserted in the Forecast of 1873. And it is satisfactory to be able to state that in the Rajpootana lines (Delhi and Agra, 396 miles), now approaching completion, there is a fair assurance that the estimates will not be materially exceeded, and that the lines, including the Jumna Bridge at Agra, and all other works, as well as rolling stock, will be completed for 6,000 *l.* per mile. The Nizam's railway, also approaching completion, will be finished nearly within the estimate. This line is omitted from the Forecast, being at the charge of he Nizam's revenues.

14. In the estimate of the income from the State Railways there are four circumstances which require notice. The first is that some of the staff and a good deal of material and rolling-

Appendix, No. 3.

rolling-stock was diverted to the Durbhunga Railway, owing to the famine, and so both construction operations and the working of traffic on the other lines was interrupted.

15. Secondly, the delay in settling the gauge question kept back construction operations on both the Indus Valley and Punjab Northern Lines, and the final decision for the broad gauge will increase the capital outlay by a million and three-quarters sterling.

16. Thirdly, an alteration has been made in the calculations of the anticipated net earnings which gives a less favourable return. And fourthly, the charge for interest has been calculated at the rate of 4½ per cent. instead of at 4 per cent., as in the previous Forcast.

17. From these causes the present State Railway Forecast is not so favourable as that of 1873.

18. The following is a comparison :—

Years.	Net Charge for State Railways on the Revenues of India, with Number of Miles Open, according to Forecast of—			
	1875.		1873.	
	Miles.	£.	*Miles.*	£.
1872–73	55	136,371	55	129,780
1873–74	120	255,730	150	221,979
1874–75	402	361,435	775	280,380
1875–76	823	460,823	1,335	278,030
1876–77	1,225	469,679	1,810	317,730
1877–78	1,622	497,265	2,125	378,280
1878–79	1,997	527,765	Not estimated.	
1879–80	2,372	568,265		

19. Taking the Guaranteed and State Railways together, the results are—

Years.	Net Charge on the Revenue according to the Forecasts of—					
	1875.			1873.		
	Guaranteed.	State.	Total.	Guaranteed.	State.	Total.
	£.	£.	£.	£.	£.	£.
1872–73	2,271,557	136,731	2,407,928	2,209,600	129,780	2,339,380
1873–74	1,589,789	255,730	1,845,519	1,836,200	221,979	2,058,179
1874–75	1,230,170	361,435	1,591,605	1,631,000	280,380	1,911,380
1875–76	1,684,000	460,823	2,144,823	1,567,250	278,030	1,845,280
1876–77	1,496,000	469,679	1,965,679	1,487,250	317,730	1,804,980
1877–78	1,442,000	497,265	1,939,265	1,397,250	378,280	1,775,530
1878–79	1,313,000	527,765	1,840,765	Not estimated.		
1879–80	1,215,000	568,265	1,783,265	„		

20. It will be seen from this that the facts for 1873-74 are better than the Forecast of 1873 by 212,660 *l.*; and the figures for 1874–75 are likely to turn out better than the Forecast of 1873 by about 319,775 *l.* But it has been thought prudent to look forward to less favourable years after this advance; and so the average of the three succeeding years is taken at 208,000 *l.* per annum worse than the Forecast of 1873. Still the charges on account of Railways only exceed Lord Lawrence's limit of 2,000,000 *l.* in 1872–73 and 1875–76, and are decidedly below it on the average from 1873-74 to 1878–79, inclusive.

Irrigation Works.

21. The amount of capital outlay including the Forecast of 1873 as probably required to complete the Irrigation Works in hand and under consideration, was 20,325,000 *l.* The amount entered in the Forecast of 1875 is—

	£.
Sanctioned works	15,297,000
Works under consideration	699,000
£.	15,996,000

The difference, 4,329,000 *l.*, is due to the omission of all projects of which there are not complete estimates, and to a revision of the entries of probable cost in those remaining.

The

The difference in individual cases will be found very great. A great deal of the revision is due to the fact that in 1873 the unsanctioned portion of some projects was included with the sanctioned portion. Now a separation has been made which has led to considerable reductions. On the other hand, revised estimates have come in and have been reported probable for several works, which have rendered necessary additions to this estimated cost. Appendix, No. 3.

22. The omissions now made are:—

	£.
Unsanctioned portions of the Godavery and other projects in Madras	470,000
Unsanctioned portions of the Kistna	273,000
„ „ of projects in Bombay	91,000
„ „ of the Soane Project	1,065,000
„ „ of Baree Doab Canal Extension	320,000
„ „ Western Jumna Canal Extension	414,000
Desert Canal (Sindh) transferred to Ordinary grant	96,000
Ramtek Reservoir Project abandoned	108,000
Unsanctioned works, Minor provinces	100,000
£.	2,937,000

Works omitted pending receipt of detailed estimates or for further consideration—

	£.
Taptee Canal	300,000
Works connected with Eastern Nara	867,000
Lower Baree Doab	300,000
Eastern Ganges Canal	845,000
	2,312,000
TOTAL OMISSIONS £.	5,249,000

The increases due to revision or expected increase of estimates are:—

	£.
Godavery Delta Works	123,000
Orissa Project	80,000
Remodelling Ganges Canal	45,000
Agra Canal	182,000
Lower Ganges Canal	354,000
Sirhind Canal	107,000
TOTAL INCREASES £.	891,000

The sum entered as the probable cost of these six works in the Forecast of 1873 was 9,120,000 *l.*, on which the above addition of 891,000 *l.* indicates an apprehended excess of 9¾ per cent. This is for the most part due to more careful estimates of subsidiary charges rather than to engineering miscalculations. But it is no doubt unsatisfactory, and attention will be steadily directed to the careful preparation and review of the estimates of these works.

The net result is:—

	£.
Omission of projects, and parts of projects	5,249,000
Increase due to revision of estimates	891,000
Minor alterations	29,000
	920,000
Difference £.	4,329,000

23. The Forecast Tables of the receipts from irrigation works have been worked out in much greater detail this year than was practicable in 1873. Then the total revenue derived from irrigation was only given in a memorandum approximately. This year the probable receipts are given in detail for each work in Bengal, the North Western Provinces, and the Punjab. The returns from Madras are still wanting, while those from Bombay, including Sindh, have not been accepted in the absence of information that could be considered as perfectly reliable of the exact amount of the land revenue due to irrigation works.

24. In the Forecast of 1873, according to the Memorandum, the total outlay on irrigation works, excluding Madras, had been about 9,352,000 *l.*, from which it was estimated that

Appendix, No. 3.

the Government derived a return of 523,000 *l.*, or 5·6 per cent. on the whole. Adding Madras, the capital was made up to 10,659,000 *l.*, and the returns to 890,000 *l.*, giving 8¼ per cent.

25. From the more detailed information available at present the total capital outlay to the end of 1873–74, excluding Madras, is 11,703,775 *l.*, and the returns 610,771 *l.*, being a dividend of 5·2 per cent. Adding an approximate sum for Madras, the dividend would be increased as in the estimate of 1873.

26. In 1873 no attempt was made to give detailed tables of income. The estimated income is now shown for each work, Madras and Bombay excluded. The Forecast of 1873 took the income of 1872–73 for a starting-point, and showed the increase expected at 20,000 *l.* per annum, exclusive of the new works in progress. This estimate has been more than justified; 1872–73 was known to be a bad year, and an increase of 20,000 *l.* a year was therefore calculated upon with the more confidence. The actual increase in 1873–74 over 1872–73 is 43,987 *l.* in the direct, and 24,407 *l.* in the indirect (land revenue), net receipts, making a total increase of 68,394 *l.* On the other hand the charge for interest has been calculated at the rate of 4½ per cent. instead of 4 per cent., as in the previous Forecast.

27. To compare the Forecast of 1875 with that of 1873, it will be necessary to throw it into a somewhat different form. The Forecast of 1873 started with the income of 1872–73, and the increased interest charge in that year over the charge for 1871–72. Applying the same system to the figures given in the Forecast of this year, the result is as follows:—

YEARS.	Interest Charges.		Net Direct and Indirect Income.	
	Total per Year.	Increase over 1871–72.	Total per Year.	Increase over 1872–73.
	£.	£.	£.	£.
1871–72	197,898	—	—	—
1872–73	232,590	34,692	282,822	—
1873–74	286,530	88,632	351,216	68,394
1874–75	343,141	145,243	369,041	86,219
1875–76	401,641	203,743	367,070	84,248
1876–77	460,141	262,243	414,900	132,078
1877–78	518,641	320,743	435,600	152,778
1878–79	577,141	379,243	454,700	171,878
1879–80	635,641	437,743	479,100	196,278

And the differences between the two Forecasts are shown in the following Table:—

YEARS.	Increase of Interest Charges Compared with 1871–72 according to Forecast of—		Net Increase of Income Compared with 1872–73 according to Forecast of—		Difference, Net Increase of Charge Compared with 1872–73 by Forecast of—	
	1875.	1873.	1875.	1873.	1875.	1873.
	£.	£.	£.	£.	£.	£.
1872–73	34,692	38,760	—	—	—	—
1873–74	88,632	89,400	68,394	20,000	20,238	69,400
1874–75	145,243	148,400	86,219	40,000	59,024	108,400
1875–76	203,743	206,360	84,248	60,000	119,495	146,360
1876–77	262,243	262,400	132,078	80,000	130,165	182,400
1877–78	320,743	314,560	152,778	100,000	167,965	214,560
1878–79	379,243	Not estimated.	171,878	Not estimated.	207,365	Not estimated.
1879–80	437,743	- -	196,278	- -	241,465	—

If, on the other hand, it be preferred to alter the form of the Forecast of 1873 to that of 1875, it may be done as follows:—

YEARS.	Interest Charges.		Net Direct and Indirect Revenue.	
	Increase over 1871–72.	Total.	Increase over 1872–73.	Total.
	£.	£.	£.	£.
1871–72	- - -	197,898	—	—
1872–73	38,760	236,658	- - -	282,822
1873–74	89,400	287,298	20,000	302,822
1874–75	148,400	346,298	40,000	322,822
1875–76	206,360	404,258	60,000	342,822
1876–77	262,400	460,298	80,000	362,822
1877–78	314,560	512,458	100,000	382,822

The

The differences between the two Forecasts in this form is given in the following Table:— Appendix, No. 3.

YEARS.	Interest Charges on Capital by Forecast of—		Net Direct and Indirect Revenue by Forecast of—		Net Result by Forecast of—	
	1875.	1873.	1875.	1873.	1875.	1873.
	£.	£.	£.	£.	£.	£.
1872–73	232,590	236,658	282,822	282,822	50,232	46,164
1873–74	286,530	287,298	351,216	302,822	64,686	15,524
1874–75	343,141	346,298	369,041	322,822	25,900	— 23,476
1875–76	401,641	404,258	367,070	342,822	— 34,571	— 61,436
1876–77	460,141	460,298	414,900	362,822	— 45,241	— 97,476
1877–78	518,641	512,458	435,600	382,822	— 83,041	— 129,636
1878–79	577,141	- -	454,700	- -	— 122,441	—
1879–80	635,641	- -	479,100	- -	— 156,541	—

It will be seen that the present irrigation Forecast works out for the later years better than the calculations of 1873; owing mainly to a more favourable estimate of the receipts, based upon more elaborate calculations, supported by the experience of the last two years.

General Result.

28. Bringing the Guaranteed Railways, State Railways, and Irrigation Works together, the actual and estimated charges on the revenues of India show the following results:—

Taking the calculations as to Irrigation Works after the form of the Forecast of 1875, the result is:—

YEARS.	Charge on Revenue Due to—			
	Guaranteed Railways.	State Railways.	Irrigation Works.	Entire Operations.
	Charge.	Charge.	Income.	Charge.
	£.	£.	£.	£.
1872–73	2,271,557	136,371	50,232	2,357,696
1873–74	1,589,789	255,730	64,686	1,780,833
1874–75	1,230,170	361,435	25,900	1,565,705
1875–76	1,684,000	460,823	Charge 34,571	2,179,394
1876–77	1,496,000	469,679	45,241	2,010,920
1877–78	1,442,000	497,265	83,041	2,022,306
1878–79	1,313,000	527,765	122,441	1,963,206
1879–80	1,215,000	568,265	156,541	1,939,806

The Forecast of 1873 after the same form would be:—

YEARS.	Charge.	Charge.	Income.	Charge.
	£.	£.	£.	£.
1872–73	2,209,600	129,780	46,164	2,293,216
1873–74	1,836,200	221,979	15,524	2,042,655
1874–75	1,631,000	280,380	Charge 23,476	1,934,856
1875–76	1,567,250	278,030	61,436	1,906,716
1876–77	1,487,250	317,730	97,476	1,902,456
1877–78	1,397,250	378,280	129,636	1,905,166
1878–79	- - Not estimated.		—	—

29. Taking the final result only, the comparison of the new Forecast Tables with those of 1873 gives the following result:—

YEARS.	Total Charge on Revenue due to Guaranteed and State Railways and to Increased Outlay on Irrigation Operations. Forecast of—		+ Improvement — Falling off of Forecast of 1875 Compared with Forecast of 1873.
	1875.	1873.	
	£.	£.	£.
1872–73	2,357,696	2,293,216	— 64,480
1873–74	1,780,833	2,042,655	+ 261,822
1874–75	1,565,705	1,934,856	+ 369,151
1875–76	2,179,394	1,906,716	— 272,678
1876–77	2,010,920	1,902,456	— 108,464
1877–78	2,022,306	1,905,166	— 117,140
1878–79	1,963,206	—	—
1879–80	1,939,806	—	—

Appendix, No. 3.

Or, comparing in greater detail:—

YEARS.	Difference between Forecast -{ + Improvement — Falling off of Forecast 1875 Compared with Forecast of 1873.			
	Guaranteed Railways.	State Railways.	Irrigation.	Total.
	£.	£.	£.	£.
1872-73	— 61,957	— 6,591	+ 4,068	— 64,480
1873-74	+ 246,411	— 33,751	+ 49,162	+ 261,822
1874-75	+ 400,830	— 81,055	+ 49,376	+ 369,151
1875-76	— 116,750	— 182,793	+ 26,865	— 272,678
1876-77	— 8,750	— 151,949	+ 52,235	— 108,464
1877-78	— 44,750	— 118,985	+ 46,595	— 117,140

30. It may be said in a general way that the falling-of in the three last years of the Forecast of 1875, as compared with 1873, is due to the causes in connection with State Railways mentioned in paras. 14 to 17 above. The year 1877–78 shows a slight recovery.

C. H. Dickens, Colonel, R.A.,
Secretary to the Government of India.

11 June 1875.

(No. 19, Public Works.)

Government of India.—Public Works Department.—Account.—General.

To the Most Honourable the Marquis of Salisbury, Secretary of State for India.

My Lord Marquis, Fort William, 3 February 1876.

In the Forecast of our intended operations for the extension of State Railways and Irrigation Works from extraordinary funds, which we had the honour to submit with our Despatch, No. 64, of the 11th June last, we contemplated the expenditure of four millions annually on such work, namely, 2,700,000 *l.* on railways, and 1,300,000 *l.* on irrigation works. Against each project in progress was set down for each year the full expenditure at the time considered necessary to complete it with reasonable rapidity; but in the entries relating to the official year 1876–77 and future years, there still remained certain sums undistributed, that is to say, which were not required for the works already in hand, and were therefore reserved for projects to be hereafter undertaken. These sums converted into rupees were—

For Railways.

	Rs.
1876–77	17,22,260
1877–78	72,67,910
1878–79	1,84,53,320
1879-80	2,67,20,910

For Irrigation Works.

	Rs.
1876–77	20,24,710
1877–78	23,84,270
1878–79	30,20,180
1879–80	47,14,040

We have now to address your Lordship on the subject of the appropriation of these sums to specific projects.

2. The first point to consider is how far the sums assigned for the purpose last year will now suffice for the efficient progress of the works in hand. When the Forecast of 1875 was made out, the detailed estimates for the completion of the Indus Valley Railway, and of the Punjab northern line to Jhelum on the 5½ feet gauge had not been finished, and the cost of constructing those lines was set down from such calculations as were possible on the data which then existed. In both cases the detailed estimates exceed the first calculations. Again, the Holkar Railway, and the extension to Neemuch, will also cost more than the estimate set down in 1875, and the Rajputana lines still require some additional fencing and more rolling-stock to meet the traffic which has developed. Further, the Northern Bengal Railway, for which the estimate also requires some increase, can be pushed on somewhat more rapidly than was calculated last year. On the other hand, the Tirhoot and Sindia lines will cost less than the sum set down, and in the case of the former, the rails and sleepers ordered urgently from England will fall into the current year's expenditure, thus reducing prospective outlay. In the case of irrigation works, we shall probably have a considerable increase of outlay on the Lower Ganges Canal; but the matter requires careful scrutiny and consideration, and until this has been completed, it will be undesirable to increase the annual grants for expenditure on the work. An addition of 5,00,000 rupees is required to the Moola Moola project. The only fresh project which we have received in a fit state to submit for your Lordship's sanction is that for the Swat Canal. We consider, therefore,

therefore, that the full amount of 20,24,741 rupees reserved for new irrigation projects in 1876-77, will not be required, and a portion of it may for that year be transferred to railway works. The alterations in the programme of capital outlay due to these requirements will be found in the accompanying Table No. 1, which shows the appropriation of the grants now proposed for the works in hand, and leaves the following balances available for fresh works, including both railway and irrigation:—

	Rs.
1876-77 - - - - - - - - -	10,10,000
1877-78 - - - - - - - - -	57,80,000
1878-79 - - - - - - - - -	1,44,20,000
1879-80 - - - - - - - - -	2,40,30,000
1880-81 - - - - - - - - -	3,32,90,000

3. We believe that this programme allows sufficient sums to enable the works already in hand to be carried on with proper speed to completion, so that the loss in interest, and the charges for establishment may be kept down to the lowest proportion consistent with the proper and economical construction of the works, and with other objects which must also be kept in view. The charge for establishment for the State Railway works has hitherto been from 8 to 21 per cent. on the total charge, the average being 15 per cent. The variations are governed, amongst other things, by the time necessary to prepare and obtain sanction for a project before work can be set in hand, by changes in design after work has been begun as in the case of the change of gauge of the Indus Valley and Punjab Northern Railways, and by the circumstance of satisfactory arrangements for letting the works on contract being possible or not. We think that the progress contemplated for the several railway projects is as rapid as can be conveniently worked up to in practice. For irrigation works the progress contemplated is slower, although the establishment charges bear a higher ratio to the total cost. But the progress is yet much more rapid than has obtained until recently, and when it is remembered that there is a more or less long period of growth before such works begin to earn net revenue, it will be apparent that it is not necessarily economical to open a large series of canals at once, but that is better, after the main works at the head are carried out, to let the progress of the work depend to some extent on the growth of the demand for the water. Bearing these circumstances in mind, we think the funds provided for the construction of irrigation works will also be considered reasonable. It will be seen, however, that there is a sufficient margin available one or two years hence to increase it as experience may indicate.

4. We mentioned above that there are other matters besides the rapidity of progress of each individual project to be considered in arranging a series of operations such as is now contemplated. One of these is the advantage which will be derived in regard to financial regularity as well as the systematic execution of work, if, in addition to setting aside a fixed or not greatly varying sum to be spent from year to year on capital outlay, there also be a programme settled some time beforehand of the order in which the several projects are to be taken up. Such an arrangement would enable us to carry on the whole series of works with a fixed establishment, portions of which, as one project approaches completion, would be drawn off to survey, and prepare for, and ultimately to commence construction operations on, the next. Thus operations would be carried on with regularity, and with an experienced staff, so as to secure the maximum of economy and efficiency.

5. In order to arrange such a system, it is necessary to divide the proceedings into the two stages of (1) investigation, and (2) construction. The projects selected for investigation may not always turn out to be worthy of being ultimately put under construction, so that the number or extent of projects under investigation should exceed that under construction, and should also be so far in advance of the latter, as to admit of ample time for the consideration and discussion of each project before it is decided whether or not to set the work in hand.

6. Once more, in view to carry out such a system properly, the programme must not only be fixed beforehand but properly arranged, so that while to each project is assigned a sum sufficient to complete the work with reasonable rapidity, it shall yet be provided that the projects shall, to use a convenient technical expression, break joint, or overlap, in point of time; if this be not attended to, it might happen that all those under construction would be brought to completion simultaneously, and then it would be impossible to expend the next year's grant or to keep the establishments fully employed, because it takes time to get works into full progress with proper arrangements for regular and efficient construction.

7. For these reasons, we wish to obtain your Lordship's approval to the programme of operations which we now proceed to sketch; but the projects comprised in which will be regularly submitted separately for the sanction of Her Majesty's Government as the investigation of each reaches the proper stage, that is, in those cases in which the results appear to us to be such that the commencement of construction operations can be safely recommended.

8. Turning now to the Forecast Tables, the projects for railways set down against the balances to be distributed, as those from which the selection might be made for construction, are as follows:—

(15.) Nágpur and Chattisgarh.
(16.) Neemuch—Neemuch to Nusseerabad.

Appendix, No. 3.

(17.) Mahratta—Carwar and Bellary.
(18.) Northern Punjab—Jhelum to Peshawur.
(19.) Western Rajputana.
(20.) Tirhoot—Extensions.

9. We should be disposed to select No. 18, the Northern Punjab line between Jhelum and Rawal Pindee, as one of the first for construction operations. The survey has been some time in hand, but the investigation of the new line apart from the Trunk Road has involved some difficult work, and we are of opinion that the project is hardly ready for construction operations, and that, in short, no time will be lost by having the project for this difficult country thoroughly matured before construction is begun. It will not be desirable, therefore, to include construction operations on this project in the programme for 1876–77.

Despatches Nos. 29 R and 30 R, dated 3rd February 1876.

10. We are addressing your Lordship separately regarding the following lines, which we recommend to be put in hand in October or November 1876, so that a beginning may be made, and the works got into full progress during the official year 1877–78:—

(15.) Nágpur and Chattisgarh.
(16.) Neemuch and Nusseerabad.
(19.) Western Rajputana.

11. We consider these projects more important than the Carwar and Bellary lines, for which the surveys and estimates have also been completed, and in regard to which we refer your Lordship to the correspondence quoted in the margin.

Despatch from Secretary of State, No. 161 R of 1873.
" to " " " 180 R of 1874.
" from " " " 171 R of "

12. In regard to Tirhoot, we beg to refer to our Despatch, No. 7, Railway, dated 6th January 1876, reporting what work has been undertaken.

13. Taking next the irrigation projects, the following were entered in the Forecast as those from which selection might be made for construction:—

(20.) Extension of works in the Central Delta of the Godavery.
(21.) Extension of Kistna Delta works.
(22.) Bundelkund—Betwa project.
(23.) Swat River Canal.
(24.) Extension of Canals in Sind.
(25.) Tirhoot Irrigation Works.
(26.) Derajat Canals.

14. We have received a satisfactory project for the Swat River Canal, which has accordingly been submitted to your Lordship with our Despatch, No. 116, P.W., dated 27th October 1875.

15. The Betwa project will, we believe, also prove satisfactory, but we have thought it necessary to wait for some further information from the Government of the North Western Provinces before finally deciding to recommend it for your Lordship's sanction.

16. A project for extension of the Kistna Irrigation has been submitted by the Government of Madras, but did not prove satisfactory. The Tirhoot projects are not yet sufficiently matured. We have not received as yet from the Local Governments the detailed estimates for the other projects mentioned. We have, therefore, at the moment, no other irrigation project to recommend for sanction.

17. The funds required for the three railway projects and one irrigation work which we have recommended for sanction will be easily provided for from the sums which will remain available, as indicated in para. 2 above. This is illustrated by the Table No. II. annexed to this Despatch.

18. In considering any scheme of operations for carrying on public works, it is important to bear in mind the liability the Government incurs in starting fresh works to provide the funds necessary for their completion. In this point of view the operations for State Railways proposed in the present Despatch stand as follows:—

		Rs.
Estimates for works in hand on 1st April 1875 (viz. 725 miles of 5½ feet, and 1,125 miles of metre-gauge railway)		18,10,00,000
Deduct expended to 1st April 1875		7,69,00,000
Balance of liability on 1st April 1875		10,41,00,000
Deduct estimated expenditure in 1875–76		3,09,00,000
		7,32,00,000
New Railways proposed.	Rs.	
130 miles, Nágpur and Chattisgarh	84,00,000	
133 miles, Neemuch and Nusseerabad	82,50,000	
298 miles, Western Rajpootana	1,85,00,000	
		3,51,50,000
		10,83,50,000
Deduct proposed grant for 1876–77		2,83,00,000
Estimated balance of liability on 1st April 1877	Rs.	8,00,50,000

Thus

Thus the liability of 1st April 1877 is likely to be nearly $2\frac{1}{2}$ krores of rupees less than on 1st April 1875.

It may be added that the Oudh and Rohilkhund Company's Railways, so far as it has been determined to proceed with it, are nearly complete, and as the South Indian Railway is also well advanced, and no other undertakings are in hand for which the Government is bound to guarantee capital, the liability of the Government in regard to railway projects is less now than for many years previously.

The small capital outlay required for the Swat Project will not add to the liability in respect of irrigation works, as the outlay incurred on projects already in hand will diminish the liability in respect to them to a much greater amount, and will more than absorb any excess in the cost of the Lower Ganges Canal.

19. The next point to consider is, what new projects shall be put under survey and investigation. And we may mention at the outset that we do not propose that any fresh surveys for irrigation works shall be undertaken at present. To those already mentioned as under investigation we need only add that the Sungum Project* which has lately been re-submitted by the Government of Madras, involving a probable outlay for an entire new system of irrigation amounting to *Rs.* 35,75,000, has not been as yet accepted by us, as we desire to ascertain if satisfactory results may not be secured at a much less cost by repairing and improving the existing works rather than extend them in the manner heretofore contemplated; and the Ramgunga Project† which has previously undergone investigation, and regarding which we have have addressed the Government of the North Western Provinces for further report. These two projects will be considered by us along with those previously mentioned when the necessary information is obtained. The Taptee Project is also under consideration, and will be separately reported on.

* *See* Resolution forwarded with Despatch No. 169 P.W. of 27th November 1874.

† *See* the same Resolution.

20. But in regard to railways, we have thought it proper to order the following lines to be more fully surveyed and investigated:—

Extension of the Northern Punjab Railway 50 miles from Rawulpindee to Attock;

Extension of the Northern Bengal Railway from Rungpoor, 104 miles, to Gowalpara, and thence, 76 miles, to Gowhattee in Assam;

While we have already in progress:—

The surveys for extension of railways in Tirhoot;

The surveys for extension of the Rangoon and Irrawaddi Valley Railway from Prome to the frontier;

The surveys for the projected Rangoon and Tounghoo Railway.

21. We may also mention the projected line from Moradabad to Ramnuggur on which we have addressed your Lordship separately (Despatch No. 1, Railway, dated 5th January 1876). This, though proposed to be constructed as a part of the guaranteed undertakings of the Oudh and Rohilkhund Railway Company, must be considered along with the State lines as additional to the projects heretofore included in the forecast. We do not wish the capital for this line to be raised until we have considered it in connection with other works next year, and, indeed, it is not probable that the necessary arrangements with the railway company can be completed for a commencement of work earlier. The small sum required for this undertaking will not materially affect the liability of the Government (para. 18), and it is to be hoped that the reduction of surplus stores and stock on the guaranteed railways will much more than cover a capital outlay of 400,000 *l.*

22. Since we considered the questions which are dealt with in this Despatch, and arrived at the conclusions submitted for your Lordship's consideration, a serious fall in the price of silver in London has occurred, which may produce very grave effects upon the financial condition of India. We must, therefore, add that the recommendations we now make regarding the progress of public works, extraordinary, are subject to such modifications as may seem to us to be necessary or expedient when the general prospects of our finances have been fully considered, and the Budget for 1876–77 has been prepared.

We have, &c.

(signed) *Northbrook.*
H. W. Norman.
A. Hobhouse.
E. C. Bayley.
W. Muir.
A. J. Arbuthnot.
A. Clarke.

TABLE, No. I.

TABLE of CAPITAL OUTLAY, Actual and Proposed, on RAILWAYS and IRRIGATION WORKS already in Progress and Chargeable to the Head Extraordinary.

No.	NAMES OF WORKS.	RAILWAYS. Gauge.	RAILWAYS. Length.	Probable Cost.	Outlay to April 1875.	Estimated Outlay in 1875-76.	PROPOSED OUTLAY. 1876-77.	1877-78.	1878-79.	1879-80.	1880-81.	REMARKS.
	PROJECTS IN HAND. (1.)—RAILWAYS.		*Miles.*	*Rs.*	*Rs.*	*Rs.*	*Rs.*	*Rs.*	*Rs.*	*Rs.*	*Rs.*	
1	Indus Valley	5½ feet	498	6,00,00,000	1,73,00,000	97,00,000	1,00,00,000	1,00,00,000	80,00,000	50,00,000	- -	To be finished in March 1880.
2	Punjab Northern Railway to Jhelum	5½ feet	104	2,60,00,000	1,74,00,000	39,00,000	27,00,000	15,00,000	5,00,000	- -	- -	To be finished by June 1877, but will be opened by March 1877 on the broad gauge.
3	Rajputana	Metre	396	2,60,00,000	2,12,00,000	28,00,000	14,00,000	6,00,000	- -	- -	- -	Already open, but some additional works and rolling stock required.
4	Wardha Valley	5½ feet	46	50,00,000	24,00,000	12,00,000	9,00,000	5,00,000	- -	- -	- -	Partly open already.
5	Holkar	Metre	85½	1,15,00,000	78,00,000	23,00,000	12,00,000	2,00,000	- -	- -	- -	- ditto.
6	Indore to Neemuch	„	169	1,25,00,000	38,00,000	17,00,000	20,00,000	20,00,000	20,00,000	10,00,000	- -	Carried on by sections, as each extension may usefully be worked.
7	Northern Bengal	„	225	1,60,00,000	44,00,000	36,00,000	35,00,000	29,00,000	16,00,000	- -	- -	To be opened in 1877, and finished in 1878-79.
8	Scindia	5½ feet	77	90,00,000	2,00,000	7,00,000	20,00,000	21,00,000	25,00,000	15,00,000	- -	Cannot be opened through till Chumbul Bridge is completed.
9	Tirhoot	Metre	90	60,00,000	16,00,000	12,00,000	15,00,000	15,00,000	2,00,000	- -	- -	A part of the work deferred for further observations of Ganges erosion.
10	Rangoon and Irrawaddi Valley	„	160	90,00,000	8,00,000	38,00,000	24,00,000	15,00,000	5,00,000	- -	- -	To be partially opened in 1877, and finished in 1878.
	TOTAL RAILWAYS in Progress	-	-	18,10,00,000	7,69,00,000	3,09,00,000	2,76,00,000	2,28,00,000	1,53,00,000	75,00,000	—	
	(2.)—IRRIGATION WORKS.											
1	Godavery Delta additions	-	-	36,90,000	18,30,000	4,70,000	4,00,000	4,00,000	3,70,000	2,20,000	- -	To be completed in 1879-80; carried on gradually.
2	Smaller Projects in Madras	-	-	42,60,000	35,60,000	2,20,000	1,70,000	1,70,000	1,40,000	- -	- -	To be completed in 1878.
3	Moota Moola Project	-	-	54,30,000	39,50,000	4,80,000	5,00,000	5,00,000	- -	- -	- -	To be completed in 1878.
4	Other Projects in Bombay	-	-	42,20,000	36,00,000	2,70,000	1,00,000	1,00,000	1,50,000	—	—	
5	Soane Project	-	-	2,71,00,000	1,25,30,000	25,50,000	24,00,000	24,00,000	24,00,000	24,00,000	24,20,000	To be completed in 1881.
6	Orissa	-	-	2,85,00,000	2,27,20,000	17,10,000	15,00,000	15,00,000	10,70,000	- -	- -	The limited project now determined on to be completed in 1879.
7	Remodelling and Extension of Old Ganges Canal	-	-	90,00,000	33,30,000	6,00,000	8,00,000	8,00,000	8,00,000	8,00,000	8,00,000	The alteration of a canal in work can only proceed gradually. To be finished in 1883.
8	Agra Canal	-	-	75,70,000	63,30,000	7,00,000	3,40,000	2,00,000	- -	- -	- -	Canal already in work.
9	Lower Ganges Canal	-	-	2,05,30,000	62,00,000	28,60,000	24,30,000	26,00,000	26,00,000	26,00,000	12,40,000	Estimate requires revision. Date of completion uncertain.
10	Improvements and Extension of Western Jumna Canal	-	-	75,60,000	15,10,000	6,00,000	7,50,000	7,50,000	7,50,000	7,50,000	7,50,000	To be finished in 1883.
11	Ditto - - ditto Baree Doab Canal	-	-	48,00,000	26,00,000	5,00,000	5,00,000	5,00,000	5,00,000	2,00,000	- -	To be finished in 1879.
12	Sirhind Canal:— *Rs.* Total Cost 3,08,70,000 Less Share of Native States 1,18,70,000											
	British Share	-	-	1,90,00,000	60,20,000	12,50,000	15,00,000	15,00,000	15,00,000	15,00,000	15,00,000	To be finished in 1884, but may be opened earlier.
	TOTAL IRRIGATION WORKS	-	-	14,16,60,000	7,41,80,000	1,22,10,000	1,13,90,000	1,14,20,000	1,02,80,000	84,70,000	67,10,000	
	TOTAL RAILWAYS and IRRIGATION	-	-	32,26,60,000	15,10,80,000	4,31,10,000	3,89,90,000	3,42,20,000	2,55,80,000	1,59,70,000	67,10,000	
	Balance available for other Works	-	-	- -	- -	- -	10,10,000	57,80,000	1,44,20,000	2,40,30,000	3,32,90,000	
	TOTAL	-	-	- -	- -	- -	4,00,00,000	4,00,00,000	4,00,00,000	4,00,00,000	4,00,00,000	

TABLE, No. II.

TABLE of CAPITAL OUTLAY proposed on PROJECTS now Recommended to be Set in Hand and Charged to the Head Extraordinary.

No.	NAMES OF PROJECTS.	RAILWAYS. Gauge.	RAILWAYS. Length.	Probable Cost.	PROPOSED OUTLAY. 1876-77.	1877 78.	1878-79.	1879-80.	1880-81.	REMARKS.
	(1.)—RAILWAYS.		*Miles.*	*Rs.*	*Rs.*	*Rs.*	*Rs.*	*Rs.*	*Rs.*	
1	Nagpur and Chattisgarh - -	5½ ft.	130	84,00,000	3,00,000	15,00,000	25,00,000	25,00,000	16,00,000	To be finished in 1880.
2	Western Rajputana - -	Metre	298	1,85,00,000	4,00,000	20,00,000	40,00,000	50,00,000	50,00,000	To be finished in 1882.
3	Neemuch to Nusseerabad -	-	133	82,50,000	- -	5,00,000	25,00,000	25,00,000	25,00,000	To be finished in 1881.
		—	—	3,51,50,000	7,00,000	40,00,000	90,00,000	1,00,00,000	91,00,000	
	(2.)—IRRIGATION WORKS:									
1	Swat Project - - -	-	-	17,00,000	1,30,000	5,00,000	5,00,000	4,00,000	1,70,000	To be finished in 1880. The supply of labour is scanty.
		—	—	3,68,50,000	8,30,000	45,00,000	95,00,000	1,04,00,000	92,70,000	
	Balance which will still remain for other Works - - -	-	-	- -	1,80,000	12,80,000	49,20,000	1,36,30,000	2,40,20,000	
	TOTAL available, as per Table, No. 1. - -	-	-	- -	10,10,000	57,80,000	1,44,20,000	2,40,30,000	3,32,90,000	

Appendix, No. 4.

PAPER handed in by General *Dickens*.

EAST INDIA FINANCE AND REVENUE ACCOUNTS.

IN order to show more clearly all transactions relating to Public Works constructed out of Loans, the annexed Forms of Account have been prepared, and will be substituted for the "General Account," and Numbers 1, 2, 3, 4, 53, 71, and 72 of the Finance and Revenue Accounts, and the Form marked A., will be added to those Accounts.

In the collections now printed the Forms have been filled up from the best information available in the India Office.

GENERAL ACCOUNT of the REVENUE and EXPENDITURE and RECEIPTS and DISBURSEMENTS

	No. of Account.	No. of Page.	INDIA.	ENGLAND.	TOTAL.
			£.	£.	£.
BALANCE on the 1st April 1875 - - - - -	69	143	15,177,814	2,796,370	17,974,184
	India.	England.			
Revenue, Ordinary - -	£. 49,500,635	£. 290,923			
Revenue from Productive Public Works - -	5,438,492	890			
£.	54,939,127	291,813	–	–	54,939,127	291,813	55,230,940
DEBT.					
Permanent Debt incurred, exclusive of that for Productive Public Works - - - - - - -	61	136	2,949,419	1,200,000	4,149,419
Temporary or Floating Debt incurred - - -	–	–	—	—	—
Treasury Notes, bearing Interest, issued to Service Funds - - - - - - - - - -	63	137	299,946	- -	299,946
Receipts of Service Funds bearing Interest - - -	64	137	544,165	- -	544,165
Savings Bank Deposits received - - - -	65	138	737,539	- -	737,539
Debt incurred for Productive Public Works - -	–	–	—	—	—
Debt transferred for ditto :—					
Irrigation - - - - - £. 17,000,000					
State Railways - - - - 15,000,000					
	A	–	32,000,000	- -	32,000,000
Local Funds - - - - - - - - - -	66	139	11,294,641	- -	11,294,641
Political Trust, Prize, and Railway Funds - - -	68	142	308,000	- -	308,000
DEPOSITS, ADVANCES, &c.					
Deposits - - - - - - - - - - -	67	139	8,569,091	- -	8,569,091
Repayment of Advances - - - - - - -	–	–	3,719,944	6,842	3,726,786
Repayment of Sums advanced on Loan to Municipalities, Native States, &c. - - - - - - - -	70	144	171,311	- -	171,311
Capital Receipts of Guaranteed Railway and other Companies - - - - - - - - -	75	158	1,550,507	1,686,903	3,237,410
Remittances between Districts - - - - - -	–	–	885,881	- -	885,881
Miscellaneous - - - - - - - - - -	–	–	412,691	6,299	418,990
ACCOUNTS BETWEEN PRESIDENCIES.					
Bills drawn, Remittances of Treasure, Advances recovered - - - - - - - - - - -	–	–	16,553,295	- -	16,553,295
ACCOUNTS BETWEEN INDIA AND ENGLAND.					
Amount received for Bills drawn by Secretary of State on Treasuries in India - - - - - - -	78	167	- -	12,389,613	12,389,613
Other Remittance Transactions - - - - - -	–	–	1,207,213	111,870	1,319,083
TOTAL - - - £.			151,320,584	18,489,710	169,810,294

	£.
Revenue - - - - - - - - - - -	55,230,940
Expenditure chargeable thereon - - - - - - -	53,344,066
Excess of Revenue over Expenditure - - - £.	1,886,874

of the Government of *India*, in *India* and in *England*, for the Year ended 31st March 1876.

	India.	England.	No. of Account.	No. of Page.	INDIA.	ENGLAND.	TOTAL.
	£.	£.			£.	£.	£.
Expenditure, Ordinary -	38,154,591	8,179,740					
Expenditure on Productive Public Works (Working Expenses and Interest)	2,352,849	4,656,886					
£.	40,507,440	12,836,626	2	5	40,507,440	12,836,626	53,344,066
DEBT.							
Permanent Debt discharged, exclusive of that for Productive Public Works - - - - - - -			61	136	26,397	- -	26,397
Permanent Debt reduced by Transfer to Debt incurred for Productive Public Works - - - - -			—	—	32,000,000	- -	32,000,000
Loan from King of Oudh discharged - - - -			—	—	13,500	- -	13,500
Temporary or Floating Debt paid off - - - -			—	—	—	—	—
Treasury Notes of Service Funds paid off - - -			63	137	190,912	- -	190,912
Payments out of Deposits of Service Funds bearing Interest - - - - - - - - - -			64	137	432,319	- -	432,319
Savings Bank Deposits repaid - - - - -			65	138	653,518	- -	653,518
Productive Public Works, Capital Expenditure :—							
Irrigation - - - - -	£. 1,302,146						
State Railways - - - -	3,186,412		A	—	3,740,650	747,908	4,488,558
Local Funds - - - - - - - - - -			66	139	11,712,283	- -	11,712,283
Political Trust, Prize, and Railway Funds - - -			68	142	413,423	- -	413,423
DEPOSITS, ADVANCES, &c.							
Deposits - - - - - - - - - -			67	139	8,750,957	- -	8,750,957
Advances repayable - - - - - - - -			—	—	3,439,633	11,732	3,451,365
Advances by way of Loan to Municipalities, Native States, &c. - - - - - - - - -			70	144	558,798	- -	558,798
Payments to Railway and other Guaranteed Companies out of Capital Funds - - - - - - -			75	158	1,383,516	2,897,078	4,280,594
Remittances between Districts - - - - - -			—	—	725,229	- -	725,229
Miscellaneous - - - - - - - - -			—	—	726,447	- -	726,447
ACCOUNTS BETWEEN PRESIDENCIES.							
Bills paid, Remittances of Treasure, Advances made -			—	—	15,818,663	- -	15,818,663
ACCOUNTS BETWEEN INDIA AND ENGLAND.							
Secretary of State's Bills paid in India - - -			78	167	13,081,147	- -	13,081,147
Other Remittance Transactions - - - - -			—	—	193,258	1,076,467	1,269,725
BALANCE on the 31st March 1876 - -			69	143	16,952,494	919,899	17,872,393
TOTAL - - - £.					151,320,584	18,489,710	169,810,294

No. 1.—ACCOUNT of the REVENUE of *India*, showing the AMOUNT received on each Account

HEADS OF REVENUE.	No. of Account.	No. of Page.	INDIA,* General and Political.	OUDH.	CENTRAL PROVINCES.	BRITISH BURMAH.	ASSAM.	
Land Revenue:—			£.	£.	£.	£.	£.	
Total Collections	7	12	68,678	1,407,431	607,885	823,655	337,358	1
Deduct enhancement of the Land Revenue assessed as due to the operation of Irrigation Works constructed with capital supplied by the British Government †	–	–	- -	- -	- -	- -	- -	2
BALANCE, Ordinary Land Revenue	–	–	68,678	1,407,431	607,885	823,655	337,358	3
Tributes and Contributions	8	16	244,654	- -	13,799	- -	- -	4
Forest	9	17	10,936	29,466	72,618	177,902	6,187	5
Excise on Spirits and Drugs	10	19	18,137	79,102	135,639	159,559	141,456	6
Assessed Taxes	11	20	147	35	1	- -	- -	7
Customs	12	21	- -	20,759	10,151	458,591	- -	8
Salt	13	25	93,019	1,487	19,066	16,032	- -	9
Opium	14	27	- -	- -	- -	- -	- -	10
Stamps	15	29	23,550	94,042	97,261	63,495	51,572	11
Mint	16	30	58,450	- -	- -	- -	- -	12
Post Office	17	32	91,895	17,612	18,347	15,926	10,961	13
Telegraph	18	34	291,918	- -	- -	- -	- -	14
Law and Justice	19	41	27,344	10,200	14,540	20,035	8,514	15
Marine ‡	20	45	349	- -	- -	8,386	- -	16
Interest	21	52	283,708	5,491	3,611	2	1,262	17
Receipts in aid of Superannuation, Retired, and Compassionate Allowances	24	57	268,515	1,407	145	417	88	18
Gain by Exchange on Transactions with London	26	59	365,372	377	- -	715	- -	19
Miscellaneous	28	60	63,688	1,117	1,037	1,109	3,612	20
Public Works, Ordinary	44	88	24,313	952	713	1,057	187	21
„ Irrigation, Ordinary	45	89	28	- -	- -	100	- -	22
Army	–	–	556,497	- -	- -	- -	- -	23
REVENUE, Ordinary	–	–	2,491,198	1,669,478	994,813	1,746,981	561,197	4
REVENUE FROM PRODUCTIVE PUBLIC WORKS.								
Irrigation, including Collections with Land Revenue	–	–	- -	- -	- -	- -	- -	25
State Railways:								
Gross Traffic Receipts	–	–	289,512	- -	- -	- -	- -	26
Guaranteed Railways:								
Net Traffic Receipts	–	–	3,920,877	- -	- -	- -	-	27
REVENUE from Productive Public Works	–	–	4,210,389	- -	- -	- -	- -	28
TOTAL REVENUE	–	–	6,701,587	1,669,478	994,813	1,746,981	561,197	29

* Under this heading are shown the receipts and charges connected with the Bengal Army, the Telegraph, the Calcutta Mint, and other departments, under the direct administration of the Governor General in Council, the Revenue and Charges of the district of Coorg, and the expenses of the British representatives at the principal Native Courts in India.

† The *financial* object of the capital outlay on canals is twofold; (1) to make a profit by the sale of water to the cultivator, and (2) to gain increased revenue from the land. The second of these objects is attained through the effect of the facilities for irrigation on the rent, the land revenue in India being the Government share of the rent. In the North-Western Provinces, and in the case of the permanent canals of the Punjab, these two financial objects are separately carried out, the enhancement of the land revenue being then called *indirect* revenue. But the enhancement is a real gain to Government, regularly assessed at the time of each revision of the land revenue. A special assessment can be made at intermediate periods as "owners' rate" under a recent law. Losses of revenue by any injury to or deterioration of the land considered to be due to the irrigation, are debited, and improvement of the rent credited, the balance being usually on the whole enhancement as

in the several PROVINCES of *British India*, and in *England*, for the Year ended 31st March 1876.

	BENGAL.	NORTH-WESTERN PROVINCES.	PUNJAB.	MADRAS.	BOMBAY, including SIND.	TOTAL INDIA.	ENGLAND.	GRAND TOTAL.
	£.	£.	£.	£.	£.	£.	£.	£.
1	3,776,506	4,245,745	2,001,117	4,545,013	3,690,354	21,503,742	- -	21,503,742
2	- -	92,281	105,264	367,948	158,337	723,830	- -	723,830
3	3,776,506	4,153,464	1,895,853	4,177,065	3,532,017	20,779,912	- -	20,779,912
4	- -	- -	28,380	344,643	94,712	726,188	- -	726,188
5	19,827	96,970	90,983	42,772	121,867	672,528	- -	672,528
6	608,818	223,614	95,478	633,901	397,528	2,493,232	- -	2,493,232
7	„ 20	199	1	60	47	510	- -	510
8	1,076,364	39,204	92,667	307,962	715,691	2,721,389	- -	2,721,389
9	2,561,553	528,510	790,518	1,353,789	880,441	6,244,415	- -	6,244,415
10	5,921,928	- -	- -	- -	2,549,497	8,471,425	- -	8,471,425
11	935,019	354,179	247,293	501,971	466,986	2,835,368	- -	2,835,368
12	- -	- -	- -	300	51,709	110,459	30	110,489
13	159,391	91,358	138,738	97,207	122,162	763,597	- -	763,597
14	- -	- -	- -	- -	- -	291,918	17,122	309,040
15	68,335	51,301	44,056	43,379	28,288	315,992	- -	315,992
16	147,264	- -	- -	1,249	69,939	227,187	700	227,887
17	75,991	12,791	1,778	26,977	113,305	524,916	36,273	561,189
18	5,068	2,366	2,083	244,234	131,844	656,167	92,999	749,166
19	2,669	3,253	416	8,254	14,309	395,365	- -	395,365
20	82,196	18,993	8,597	17,790	64,796	262,935	18,833	281,768
21	7,043	5,465	1,065	5,328	10,255	56,378	17,551	73,929
22	3,420	166	659	4,486	3,431	12,290	267	12,557
23	- -	- -	- -	172,648	209,319	938,464	107,148	1,045,612
24	15,451,412	5,581,833	3,438,565	7,984,015	9,581,143	49,500,635	290,923	49,791,558
25	23,043	375,659	288,360	376,473	161,368	1,228,993	- -	1,228,993
26	- -	- -	- -	- -	- -	289,512	- -	289,512
27	- -	- -	- -	- -	- -	3,920,877	- -	3,920,877
28	23,043	375,659	288,360	376,473	161,368	5,439,382	- -	5,439,382
29	15,474,455	5,957,500	3,726,925	8,360,488	9,742,511	54,939,127	290,923	55,230,940

as above shown. In other cases, as those of the inundation canals in Sind and the Punjab, no distinction is made between the land revenue due to the canals and the sale of water to the cultivators, for the simple reason that as a rule there is no cultivation possible in the tracts watered by the canals except what is due to the canals, so that, in a sense, the whole land revenue is due to the canals. In Madras, what is called a water-rate, is levied with the land revenue, and has till now been credited entirely under that head in the Finance and Revenue Accounts, no notice being taken of the fact that it is due to irrigation. This is changed in the present accounts, the water rates of Madras and the enhancement of the revenue due to the canals elsewhere being now for the first time separated and credited to the works. The reason why the enhancement of land revenue is calculated in the case of canals and not in the case of railways is, that it was a main financial object of the construction of the works in the one case, and not so in the other.

‡ Including Inland Navigation.

No. 2.—ACCOUNT of the ORDINARY EXPENDITURE chargeable on the REVENUES of *India* for the Year ended 31st March 1876.

HEADS OF EXPENDITURE.	No. of Account.	No. of Page.	INDIA, General and Political.	OUDH.	CENTRAL PROVINCES.	BRITISH BURMAH.	ASSAM.	BENGAL.	NORTH-WESTERN PROVINCES.	PUNJAB.	MADRAS.	BOMBAY, including SINDH.	TOTAL INDIA.	ENGLAND.		GRAND TOTAL.
														Stores for India.	Other Charges.	
			£.	£.	£.	£.	£.	£.	£.	£.	£.	£.	£.	£.	£.	£.
Refunds and Drawbacks	30	62	16,946	5,311	4,466	23,376	4,314	102,837	14,585	13,168	30,430	120,891	336,324	- -	- -	336,324
Payments in realization of Revenue:																
Land Revenue	7	13	109,224	82,358	65,934	110,121	73,750	283,879	429,431	245,917	445,665	658,864	2,505,143	2,038	2,246	2,509,427
Forest	9	17	12,644	18,420	37,200	81,475	6,188	13,909	53,791	55,422	43,018	77,905	399,972	418	2,130	402,520
Excise on Spirits and Drugs	10	19	390	3,170	5,286	755	1,119	29,038	11,460	5,783	19,703	6,151	82,855	- -	- -	82,855
Customs	12	24	- -	- -	- -	20,252	- -	66,959	- -	- -	18,728	79,648	185,587	144	- -	185,731
Salt	13	25	252,207	- -	- -	421	- -	11,363	- -	- -	187,037	56,102	507,130	192	88	507,410
Opium	14	28	- -	- -	- -	- -	- -	2,216,044	- -	- -	- -	1,807	2,217,851	714	- -	2,218,565
Stamps	15	29	566	2,185	1,284	1,170	908	23,966	4,812	6,943	13,673	15,617	71,124	35,270	- -	106,394
Mint	16	30	42,984	- -	- -	- -	- -	- -	- -	- -	2,931	36,361	82,276	25,310	40	107,626
Post Office	17	32	35,700	11,661	17,064	8,852	12,874	232,651	91,849	144,271	76,030	126,000	756,952	9,855	55,272	822,079
Telegraph	18	34	405,462	- -	- -	- -	- -	- -	- -	- -	- -	- -	405,462	47,378	37,784	490,624
Allowances and Assignments under Treaties and Engagements	36	68	166,625	70,226	60,692	- -	5,750	245,460	49,552	83,711	255,064	757,308	1,694,388	- -	19,336	1,713,724
TOTAL of the Direct Claims and Demands upon the Revenues, including Charges of Collection, and Cost of Salt and Opium	-	-	1,042,748	193,331	191,926	246,422	104,903	3,226,106	655,480	555,215	1,092,279	1,936,654	9,245,064	121,319	116,896	9,483,279
Interest on Permanent and Floating Debt, exclusive of that for productive Public Works	22	54	1,577,253	- -	- -	- -	- -	- -	- -	- -	- -	- -	1,577,253	- -	2,160,855	3,738,108
Interest on Service Funds and other obligations	23	55	242,445	639	512	359	266	14,497	2,028	818	47,525	76,238	385,327	- -	533	385,860
Administration	31	63	443,857	35,528	41,661	36,687	16,634	162,578	125,519	112,977	122,444	157,473	1,255,358	209,032	232,975	1,697,365
Minor Departments	32	65	213,404	1,313	1,518	3,864	2,250	17,127	4,576	6,039	9,539	13,981	273,611	14,714	21,074	309,399
Law and Justice	19	42	138,435	67,211	67,070	75,340	48,322	652,314	315,090	190,095	361,108	420,021	2,335,006	1,207	264	2,336,477
Marine*	20	46	17,091	- -	- -	27,015	- -	223,967	- -	800	7,303	153,107	429,283	80,322	118,097	627,702
Ecclesiastical	33	66	11,040	3,544	3,204	4,132	1,214	23,608	19,561	21,398	38,314	30,987	157,002	156	900	158,058
Medical	34	66	1,155	8,334	12,556	10,830	5,741	34,011	29,249	22,327	31,258	26,467	181,928	- -	- -	181,928
Political Agencies	35	67	196,176	- -	298	20,280	1,980	5,736	3,281	95,777	11,940	78,774	414,242	296	14,997	429,535
Superannuation, Retired, and Compassionate Allowances	25	58	315,484	8,179	11,275	7,811	3,317	71,137	58,110	29,057	153,940	140,485	798,795	- -	1,140,510	1,939,305
Loss by Exchange on Transactions with London	27	59	901,217	- -	1	707	- -	13	9	6	28,907	498,798	1,429,658	- -	- -	1,429,658
Miscellaneous	29	61	55,096	1,342	830	3,344	1,314	22,843	7,044	8,500	28,834	19,184	148,331	- -	38,430	186,761

Civil Furlough and Absentee Allowances	–	–	–	–	–	–	–	–	–	–	–	–	768	768	–	–	228,431	229,199
Allotments for Provincial Services	37	71	37,035	212,300	278,484	324,636	176,976	1,106,152	651,650	542,316	835,570	982,233	5,153,352	–	–	300	5,153,652
Army	39	73	6,606,867	–	–	–	–	–	–	–	2,736,993	2,381,404	11,725,264	1,096,947	2,486,249	15,308,460	
Public Works, Ordinary	43	85	1,103,558	3,604	62,043	89,736	6,397	132,171	84,476	46,875	284,484	323,038	2,136,382	20,650	73,999	2,231,031	
Famine Relief	38	71	–	–	–	–	–	–	507,967	–	–	–	–	507,967	–	–	587	508,554
EXPENDITURE, ORDINARY	–	–	12,902,861	541,325	671,378	851,163	369,314	6,200,227	1,956,073	1,632,200	5,790,438	7,239,612	38,154,591	1,544,643	6,635,097	46,334,331	
EXPENDITURE on PRODUCTIVE PUBLIC WORKS (Working Expenses and Interest):																	
Irrigation Works:																	
Interest on Debt incurred and transferred	A	–	–	–	–	–	–	–	211,500	247,500	166,500	94,500	45,000	765,000	–	–	–	765,000
Working Expenses and Maintenance	–	–	–	–	–	–	–	–	52,949	145,015	136,214	62,572	(deducted from Revenue.)	396,750	–	–	–	396,750
TOTAL IRRIGATION	–	–	–	–	–	–	–	–	264,449	392,515	302,714	157,072	45,000	1,161,750	–	–	–	1,161,750
State Railways:																	
Interest on Debt incurred or transferred	A	–	675,000	–	–	–	–	–	–	–	–	–	–	675,000	–	–	–	675,000
Working Expenses and Maintenance	–	–	193,485	–	–	–	–	–	–	–	–	–	–	193,485	–	–	–	193,485
TOTAL STATE RAILWAYS	–	–	868,485	–	–	–	–	–	–	–	–	–	–	868,485	–	–	–	868,485
Guaranteed Railways:																	
Guaranteed Interest	3	6	30,988	–	–	–	–	–	–	–	–	–	–	30,988	–	–	4,656,886	4,687,874
Moiety of Surplus Profits paid to Companies	4	6	208,313	–	–	–	–	–	–	–	–	–	–	208,313	–	–	–	208,313
Land and Government control	60 A	134	–	–	3,830	81	–	–	3,183	6,168	8,935	44,031	17,085	83,313	–	–	–	83,313
TOTAL GUARANTEED RAILWAYS	–	–	239,301	3,830	81	–	–	3,183	6,168	8,935	44,031	17,085	322,614	–	–	4,656,886	4,979,500	
Expenditure on Productive Public Works (Working Expenses and Interest)	–	–	1,107,786	3,830	81	–	–	267,632	398,683	311,649	201,103	62,085	2,352,849	–	–	4,656,886	7,009,735	
TOTAL	–	–	14,010,647	545,155	671,459	851,163	369,314	6,467,859	2,354,756	1,943,849	5,991,541	7,301,697	40,507,440	1,544,643	11,291,983	53,344,066	
														12,836,626			

* Including Inland Navigation.

STATEMENT showing the ESTIMATED COST of CONSTRUCTION of PRODUCTIVE IRRIGATION WORKS, on the EXPENDITURE incurred in respect of those

WORKS.	Estimated Cost of Construction.	Capital Outlay		Revenue during 1875-76.			
		During 1875-76.	To end of 1875-76.	Not Collected with Land Revenue.	Collected with Land Revenue.	TOTAL.	
MADRAS.	£.	£.	£.	£.	£.	£.	
Godavery Delta Works	836,138	34,419	736,444	6,506	156,822	163,328	1
Kistna Delta Works	474,443	- -	463,590	2,019	89,075	91,094	2
Pennair Delta Works	134,409	- -	134,020	- -	- -	- -	3
Palandorai or Vellore Delta Works	20,055	- -	25,300	- -	- -	- -	4
Cauvery (1873-74)	- -	4,984	133,964	- -	116,071	116,071	5
Streevigantum Project (1874-75)	104,048	6,571	106,060	- -	3,878	3,878	6
Madras Water Works, with combined Irrigation Project	122,555	612	125,236	- -	- -	- -	7
Chembrumbaukum Tank	48,500	4,925	48,256	- -	- -	- -	8
Perryar Project	—	—	—	—	—	—	9
Palar Project (1872-73)	13,500	54	108,371	- -	2,102	2,102	10
TOTAL MADRAS £.	1,753,648	51,565	1,881,241	8,525	367,948	376,473	11
BOMBAY.							
Hathmati Canal	38,470	2,497	35,196	*—76*	- -	*—76*	12
Lakh Canal	25,754	3	28,670	34	- -	34	13
Palkhair	14,029	269	13,889	127	- -	127	14
Moota Lake and Canal	465,764	25,848	379,935	2,514	- -	2,514	15
Krishna Canal	117,315	379	115,324	1,198	- -	1,198	16
Ekrook Tank	97,446	403	92,924	293	- -	293	17
TOTAL BOMBAY £.	758,778	29,399	665,938	4,090	- -	4,090	18
SIND.							
Desert Canal and Mucksooda	85,481	12,402	45,843	- -	1,282	1,282	19
Fuleli	- -	1,550	65,229	1,753	31,163	32,916	20
Great Marrack	16,221	67	16,887	222	6,144	6,366	21
Surfrazwah	- -	- -	11,855	105	1,941	2,046	22
Western Nara	40,643	9,907	35,318	477	32,980	33,457	23
Eastern Nara	- -	6,591	280,238	170	17,791	17,961	24
Sind Canal	- -	- -	12,269	76	11,130	11,206	25
Ghar	- -	2,113	19,049	134	41,446	41,580	26
Begari	- -	162	76,282	47	4,991	5,038	27
Sukkur and Shahadadpur	89,993	5,122	104,734	47	9,469	9,516	28
TOTAL SIND £.	232,338	37,914	667,704	3,031	158,337	161,368	29
BENGAL.							
Orissa Project	1,413,722	105,615	1,657,565	4,549	- -	4,549	30
Midnapore Project	507,295	31,591	644,630	11,111	- -	11,111	31
Tidal Canal	124,497	24	179,844	2,293	- -	2,293	32
Soane Project	1,988,304	259,192	1,521,366	5,090	- -	5,090	33
Tirhoot Project	3,231	18,280	39,268	- -	- -	- -	34
Hooghly Canal	32,616	6,761	14,306	- -	- -	- -	35
Damoodah Canal	14,397	*—43*	15,763	- -	- -	- -	36
TOTAL BENGAL £.	4,084,062	421,420	4,072,742	23,043	- -	23,043	37

the CAPITAL OUTLAY thereon, the REVENUE derived therefrom, the WORKING EXPENSES, the INTEREST Works, and the Financial Result.

	Working Expenses during 1875-76.	Excluding Interest.				Interest Charge during 1875-76; 4½ per Cent.	Including Interest.			
		Excess Revenue.	Excess Expenditure.	Rate per Cent.			Excess Revenue.	Excess Expenditure.	Rate per Cent.	
				Of Excess Revenue.	Of Excess Expenditure.				Of Excess Revenue.	Of Excess Expenditure.
	£.	£.	£.			£.	£.	£.		
1	35,837	127,491	- -	17·3	—	33,140	94,351	- -	12·94	—
2	24,603	66,491	- -	14·3	—	20,861	45,630	- -	9·8	—
3	- -	- -	- -	- -	—	6,031	- -	6,031	- -	4·5
4	- -	- -	- -	- -	—	1,139	- -	1,139	- -	4·5
5	1,120	114,951	- -	85·80	—	6,028	108,923	- -	81·30	—
6	- -	3,878	- -	3·65	—	4,772	- -	894	- -	·84
7	- -	- -	- -	- -	—	5,636	- -	5,636	- -	4·5
8	- -	- -	- -	- -	—	2,172	- -	2,172	- -	4·5
9	—	—	—	—	—	—	—	—	—	—
10	1,012	1,090	- -	1·00	—	4,877	- -	3,787	- -	3·5
11	62,572	313,901	- -	16·68	—	84,656	248,904	19,659	12·18	—
12	- -	- -	76	- -	·21	1,584	- -	1,660	- -	4·7
13	- -	34	- -	·11	—	1,291	- -	1,257	- -	4·3
14	- -	127	- -	·91	—	625	- -	498	- -	3·5
15	- -	2,514	- -	·66	—	17,097	- -	14,583	- -	3·5
16	- -	1,198	- -	1·3	—	5,189	- -	3,991	- -	3·4
17	- -	293	- -	·31	—	4,181	- -	3,888	- -	4·1
18	- -	4,166	76	·61	—	29,967	- -	25,877	- -	3·8
19	- -	1,282	- -	2·79	—	2,064	- -	782	- -	1·71
20	- -	32,916	- -	50·45	—	2,935	29,981	- -	45·95	—
21	- -	6,366	- -	37·69	—	760	5,606	- -	33·19	—
22	- -	2,046	- -	17·26	—	533	1,513	- -	12·76	—
23	- -	33,457	- -	94·78	—	1,589	31,868	- -	90·28	—
24	- -	17,961	- -	6·41	—	12,610	5,351	- -	1·91	—
25	- -	11,206	- -	91·33	—	552	10,654	- -	86·83	—
26	- -	41,580	- -	218·26	—	857	40,723	- -	213·76	—
27	- -	5,038	- -	6·60	—	3,433	1,605	- -	2·10	—
28	- -	9,516	- -	9·09	—	4,713	4,803	- -	4·59	—
29	- -	161,368	- -	24·16	—	30,047	132,103	782	19·66	—
30	20,762	- -	16,213	- -	·98	74,591	- -	90,803	- -	5·48
31	16,740	- -	5,629	- -	·87	29,008	- -	34,537	- -	5·37
32	3,904	- -	1,611	- -	·89	8,093	- -	9,704	- -	5·39
33	11,543	- -	6,453	- -	·42	68,461	- -	74,914	- -	4·92
34	- -	- -	- -	- -	—	1,768	- -	1,768	- -	4·5
35	- -	- -	- -	- -	—	643	- -	643	- -	4·5
36	- -	- -	- -	- -	—	709	- -	709	- -	4·5
37	52,949	- -	29,906	- -	·73	183,273	- -	213,179	- -	5·23

STATEMENT showing the Estimated Cost of Construction of Productive Irrigation Works, Capital Outlay thereon,

WORKS.	Estimated Cost of Construction.	Capital Outlay		Revenue during 1875-76.			
		During 1875-76.	To end of 1875-76.	Not Collected with Land Revenue.	Collected with Land Revenue.	TOTAL.	
NORTH-WESTERN PROVINCES.	£.	£.	£.	£.	£.	£.	
Eastern Jumna	- -	12,274	231,743	59,249	22,152	81,401	1
Ganges Canal	- -	58,759	2,826,479	212,882	62,580	275,462	2
Agra Canal	- -	71,039	715,903	3,709	- -	3,709	3
Dün Canals	- -	942	60,603	3,601	1,595	5,196	4
Bijnor Canals	- -	- -	6,997	895	3,835	4,730	5
Rohilkund Canals	- -	6,349	135,698	2,591	1,989	4,580	6
Bundelkund Works	- -	- -	8,258	459	130	589	7
Lower Ganges Canal	- -	252,287	874,789	—6	- -	—6	8
Eastern Ganges Canal	- -	6	27,132	- -	- -	- -	9
Bundelkund New Canals	- -	2,182	29,728	—2	- -	—2	10
Agra Irrigation Works	- -	- -	22,197	- -	- -	- -	11
TOTAL NORTH-WESTERN PROVINCES, £.	- -	403,838	4,939,527	283,378	92,281	375,659	12
PUNJAB.							
Bari Doab Canal	- -	1,625,022	40,704	1,510,104	77,223	16,653	93,876	13
Western Jumna	- -	364,354	51,614	432,764	100,872	40,128	141,000	14
Lower Sutlej and Chenab Inundation Canals	- -	18,805	35	10,791	553	21,330	21,883	15
Upper Sutlej and Chenab Inundation Canals	- -	42,324	2,467	51,599	911	7,451	8,362	16
Indus and Chenab Inundation Canals	-	39,707	10,658	57,522	2,438	19,702	22,140	17
Delhi and Goorgaon Works	- -	17,723	- -	18,340	474	- -	474	18
Shapur and Shahiwal Works	- -	2,122	- -	2,122	625	- -	625	19
Shirhind Canal	- -	2,787,388	239,545	1,179,498	- -	- -	- -	20
Swat Canal	- -	- -	- -	6,984	- -	- -	- -	21
Derajat Canal	- -	1,042	5,848	26,063	- -	- -	- -	22
Lower Bari Doab Canal	- -	2,736	7,139	39,716	- -	- -	- -	23
TOTAL PUNJAB	- - £.	4,901,223	358,010	3,335,503	183,096	105,264	288,360	24

SUMMARY.

WORKS.	Estimated Cost of Construction.	Capital Outlay		Revenue during 1875-76.			
		During 1875-76.	To end of 1875-76.	Not Collected with Land Revenue.	Collected with Land Revenue.	TOTAL.	
	£.	£.	£.	£.	£.	£.	
TOTAL, MADRAS	- -	1,753,648	51,565	1,881,241	8,525	367,948	376,473	25
TOTAL, BOMBAY	- -	756,778	29,399	665,938	4,090	- -	4,090	26
TOTAL, SIND	- -	232,338	37,914	667,704	3,031	158,337	161,368	27
TOTAL, BENGAL	- -	4,084,062	421,420	4,072,742	23,043	- -	23,043	28
TOTAL, NORTH-WESTERN PROVINCES	-	- -	403,838	4,939,527	283,378	92,281	375,659	29
TOTAL, PUNJAB	- -	4,901,223	358,010	3,335,503	183,096	105,264	288,360	30
GRAND TOTAL	- - £.	11,730,049	1,302,146	15,562,655	505,163	723,830	1,228,993	31

Revenue derived therefrom, Working Expenses, Interest on Expenditure, and Financial Result—*continued.*

	Working Expenses during 1875-76.	Excluding Interest.				Interest Charge during 1875-76, 4½ per Cent.	Including Interest.			
		Excess Revenue.	Excess Expenditure.	Rate per Cent.			Excess Revenue.	Excess Expenditure.	Rate per Cent.	
				Of Excess Revenue.	Of Excess Expenditure.				Of Excess Revenue.	Of Excess Expenditure
	£.	£.	£.			£.	£.	£.		
1	23,027	58,374	- -	25·18	—	10,428	47,946	- -	20·68	—
2	105,462	170,000	- -	6·01	—	127,192	42,808	- -	1·51	—
3	8,319	- -	4,610	- -	·64	32,215	- -	36,825	- -	5·14
4	2,539	2,657	- -	4·38	—	2,727	- -	70	- -	·12
5	254	4,476	- -	63·97	—	315	4,161	- -	59·47	—
6	4,781	- -	201	- -	·14	6,106	- -	6,307	- -	4·64
7	633	- -	44	- -	·53	372	- -	416	- -	5·03
8	- -	- -	6	- -	—	39,366	- -	39,372	- -	4·5
9	- -	- -	- -	- -	—	1,221	- -	1,221	- -	4·5
10	- -	- -	2	- -	—	1,338	- -	1,340	- -	4·5
11	- -	- -	- -	- -	—	999	- -	999	- -	4·5
12	145,015	235,507	4,863	4·67	—	222,279	94,915	86,550	·17	—
13	50,240	43,636	- -	2·88	—	67,955	- -	24,319	- -	1·62
14	37,516	103,484	- -	23·92	—	19,474	84,010	- -	19·42	—
15	16,370	5,513	- -	51·09	—	486	5,027	- -	46·59	—
16	11,307	- -	2,945	- -	5·69	2,322	- -	5,267	- -	10·19
17	19,001	3,139	- -	5·45	—	2,589	550	- -	·95	—
18	1,253	- -	784	- -	4·27	825	- -	1,609	- -	8·77
19	522	103	- -	4·85	—	95	- -	- -	·35	—
20	- -	- -	- -	- -	—	53,077	- -	53,077	- -	4·5
21	- -	- -	- -	- -	—	314	- -	314	- -	4·5
22	- -	- -	- -	- -	—	1,173	- -	1,173	- -	4·5
23	- -	- -	- -	- -	—	1,787	- -	1,787	- -	4·5
24	136,214	155,875	3,729	4·56	—	150,097	89,595	87,546	·06	—

- - - - - - - - SUMMARY.

	Working Expenses during 1875-76.	Excluding Interest.				Interest Charge during 1875-76, 4½ per Cent.	Including Interest.			
		Excess Revenue.	Excess Expenditure.	Rate per Cent.			Excess Revenue.	Excess Expenditure.	Rate per Cent.	
				Of Excess Revenue.	Of Excess Expenditure.				Of Excess Revenue.	Of Excess Expenditure.
	£.	£.	£.			£.	£.	£.		
25	62,572	313,901	- -	16·68	—	84,656	248,904	19,659	12·18	—
26	- -	4,166	76	·61	—	29,967	- -	25,877	- -	3·8
27	- -	161,368	- -	24·16	—	30,047	132,103	782	19·66	—
28	52,949	- -	29,906	- -	·73	183,273	- -	213,179	- -	5·23
29	145,015	235,507	4,863	4·67	—	222,279	94,915	86,550	·17	—
30	136,214	155,875	3,729	4·56	—	150,097	89,595	87,546	·06	—
31	396,750	870,817	38,574	5·34	—	700,319	565,517	433,593	·85	—

STATEMENT showing the REVENUE and CHARGES in respect of INDIAN GUARANTEED RAILWAYS and the MADRAS IRRIGATION and CANAL COMPANY during the Year ended 31st March 1876.

COMPANY.	REVENUE.			CHARGES.						Excess Revenue.	Excess Charge.
	Traffic Receipts.	Deduct Working Expenses.	Net Traffic Receipts.	Guaranteed Interest.			Payment to Company of Moiety of Surplus Profit.	Land and Government Control.	TOTAL Charges.		
				India.	England.	TOTAL.					
	£.	£.	£.	£.	£.	£.	£.	£.	£	£.	£.
Bombay, Baroda, and Central India Railway Company	606,440	341,767	264,673	221	387,546	387,767	2,956	4,671	395,394	- -	130,721
Eastern Bengal Railway Company - - - -	303,935	191,859	112,076	1,019	130,748	131,767	4,576	226	136,569	- -	24,493
East Indian Railway Company, Main Line - - -	2,729,287	1,140,021	1,589,266	10,078	1,304,354	1,314,432	128,862	1,716	1,445,010	144,256	—
Ditto Jubbulpore Line - - - - - -	183,096	103,667	79,429	384	160,296	160,680	- -	1,241	161,921	- -	82,492
Great Indian Peninsula Railway Company - - -	2,089,949	1,102,631	987,318	12,418	1,131,623	1,144,041	71,919	12,495	1,228,455	- -	241,137
Madras Railway Company - - - - -	626,134	438,102	188,032	- -	508,114	508,114	- -	6,911	515,025	- -	326,993
Oudh and Rohilkund Railway Company - - -	*359,823	245,683	114,140	4,308	255,957	260,265	- -	3,960	264,225	- -	150,085
Sindh, Punjab, and Delhi Railway Company - -	1,211,342	679,294	532,048	2,560	551,202	553,762	- -	14,973	568,735	- -	36,687
South Indian Railway Company - - - -	139,493	69,128	70,365	- -	177,063	177,063	- -	37,120	214,183	- -	143,818
Madras Irrigation and Canal Company - - -	6,620	23,090	*— 16,470*	- -	49,983	49,983	- -	- -	49,983	- -	66,453
										144,256	1,202,879
											144,256
TOTAL - - - £.	8,256,119	4,335,242	3,920,877	30,988	4,656,886	4,687,874	208,313	83,313	4,979,500	- -	1,058,623

* Including 890 *l.* Receipts in England.

STATEMENT showing the CAPITAL OUTLAY on STATE RAILWAYS, the REVENUE derived therefrom, the WORKING EXPENSES, the INTEREST on the EXPENDITURE incurred in respect of those Works, and the Financial Result.

WORKS.	Capital Outlay		Revenue during 1875-76.	Working Expenses during 1875-76.	Excluding Interest.				Interest Charge during 1875-76., 4½ per Cent.	Including Interest.			
					Excess Revenue.	Excess Expenditure.	Rate per Cent.			Excess Revenue.	Excess Expenditure.	Rate per Cent.	
	During 1875-76.	To end of 1875-76.					Excess Revenue.	Excess Expenditure.				Excess Revenue.	Excess Expenditure.
	£.	£.	£.	£.	£.	£.			£.	£.	£.		
Calcutta and South Eastern	— *31,640*	661,188	10,486	9,303	1,183	758	·18	2·78	29,754	28,571	1,981	4·32	7·28
Nulhatee	— *148*	27,169	7,178	7,936					1,223	1,981	27,464		
Rajputana	336,937	2,459,092	203,102	119,638	83,464	2,634	3·39	·25	110,659	27,464	45,160	1·11	4·25
Holkar	283,973	1,062,105	38,349	35,715					47,794	45,160	17,328	4·25	4·55
Wardha Valley	140,894	380,333	2,936	3,150		214		·05	17,114	17,328	84,186	4·55	4·07
Punjab Northern	326,980	2,069,018	22,657	13,737	8,920		·43		93,106	84,186		4·07	
Indus Valley	1,006,210	2,730,936	In progress						122,893	122,893			
Northern Bengal	318,854	752,073							33,843	33,843			
Neemuch	200,308	583,980							26,279	26,279		4·50	
Rangoon and Irrawaddy	409,518	492,102							22,145	22,145			
Sindia	55,781	74,656							3,359	3,359			
Tirhoot	97,576	257,094	4,804	4,006	798		·31		11,569	10,771		4·19	
Western Rajputana	13,569	46,630							2,098	2,098			
Nagpore and Chutteesgurh		8,806							397	397			
Hubli and Karwar	59	55,314							2,489	2,489			
Rangoon and Sittang Valley Survey	5,558	5,558							250	250			
Assam Extension Survey (Northern Bengal)	1,164	1,164	In progress and under Survey						52	52			
Kosi Extension Survey (Tirhoot Railway)	280	280							13	13		4·50	
Moradabad, Deobund, and Roorkee		2,849							128	128			
Campoolee (proposed branch to Great Indian Peninsula Railway)		1,314							9	59			
Storekeeper, Calcutta, and Expenditure in England for Stores purchased and remaining unappropriated	20,539	397,701							17,897	17,897			
TOTAL £.	3,186,412	12,069,362	289,512	193,485	96,999	972	·79		543,121	447,094		3 71	

(A.)

ACCOUNT showing the Amount of DEBT transferred to or incurred for PRODUCTIVE PUBLIC WORKS, and the Amount applied to the CONSTRUCTION of those WORKS during the Year ended 31st March 1876, and the BALANCE.

IRRIGATION.		£.	IRRIGATION.	£.
BALANCE unapplied 1st April 1875		—	Applied to the construction of works prior to 1875-76	14,260,509
Debt transferred during 1875-76:			Ditto ditto during 1875-76	1,302,146
In India*	£. 17,000,000			
In England	—	17,000,000	BALANCE unapplied on 31st March 1876	1,437,345
	£.	17,000,000	£.	17,000,000
STATE RAILWAYS.			STATE RAILWAYS.	
BALANCE unapplied 1st April 1875		—	Applied to the construction of works prior to 1875-76	8,882,950
Debt transferred during 1875-76:			Ditto ditto during 1875-76	3,186,412
In India	£. 15,000,000			
In England	—	15,000,000	BALANCE unapplied on 31st March 1876	2,930,638
	£.	15,000,000	£.	15,000,000

	£.
*Bengal	4,700,000
North West Provinces	5,500,000
Punjab	3,700,000
Madras	2,100,000
Bombay	1,000,000
£.	17,000,000

ACCOUNT of the PUBLIC DEBT of *India*, and the INTEREST Paid thereon, for the Year ended 31st March 1876.

	Amount of Loan, 31st March 1876.	Rate of Interest per Cent.	Annual Amount of Interest.	Amount of Interest Paid during the Year.
IN INDIA.	£.	£.	£.	£.
Loan of 1859-60	10,201,670	5½	561,092	565,370
Transfer Loan of 1870	1,835,790	4½	82,611	79,504
Transfer Loan of 1871	221,900	4½	9,985	10,336
Transfer Loan of 1872	13,079,130	4½	588,561	582,562
Loan of 1824-25	31,808	4	1,272	399
Loan of 1828-29	10,730	4	429	318
Loan of 1832-33	1,250,006	4	50,000	47,029
Loan of 1835-36	3,144,790	4	125,792	125,097
Loan of 1842 43	14,472,630	4	578,905	566,552
Loan of 1854-55	6,613,720	4	264,549	289,429
Transfer Loan of 1st May 1865	17,300,752	4	692,030	602,773
Transfer Loan of 22nd April 1854	1,238,439	4	49,537	48,568
Loan of 1853-54	65,200	3½	2,282	1,680
Railway Loan from Maharajah Holkar	890,000	4½	40,050	37,575
Debenture Loan of 1867-68	1,095,900	5	54,795	53,530
Promissory Notes from Mysore Family	253,176	4	10,127	10,304
Railway Loan from Maharajah Sindiah	1,000,000	4	40,000	38,902
	72,705,641	- -	3,152,017	3,059,928
Deduct,—Portion paid in England of the sum of 48,568 *l.*, as shown below *	- -	- -	- -	45,803
				3,014,125
Paid in India on Loans in course of discharge:—				
5 per cent. Loan of 1856-57	- -	- -	- -	1,888
5 per cent. Loan of 1854-55 for Public Works	- -	- -	- -	1,217
4½ per cent. Loan of 1856-57	- -	- -	- -	23
Interest paid in India	- -	- -	- -	3,017,253
Deduct,—Transferred to Reproductive Public Works:—				
Irrigation £. 17,000,000				
State Railways 15,000,000				
	32,000,000	4½	- -	1,440,000
Balance, debt chargeable to the ordinary Revenues	40,705,641	- -	- -	1,577,253
IN ENGLAND.				
East India Bonds	3,996,700	4	159,868	159,868
India Debentures	7,000,000	4	280,000	232,000
India 5 per cent. Stock	17,200,000	5	860,000	860,007
India 4 per cent. Stock	21,579,416	4	863,177	863,177
	49,776,116	- -	2,163,045	2,115,052
Transfer Loan of 22nd April 1854 *	- -	- -	- -	45,803
Interest paid in England	- -	- -	- -	2,160,855
TOTAL chargeable to the ordinary Revenues £.	90,481,757	- -	- -	3,738,108

* Interest on this Loan is payable in England, at the option of the holder, at a fixed rate of exchange.

Appendix, No. 5.

PAPER handed in by Lord *Northbrook*, 5 April 1878.

Appendix, No. 5.

EXTRACT from a SPEECH made by Lord *Northbrook* in the Legislative Council of India, 5th August 1875.

"I am glad to embrace this opportunity of making some observations upon the general condition of the finances of India.

"During the last three years it has not been necessary for the Government to propose any fresh taxes; and, consequently, under the provisions of the Statute by which this Council is governed, there has been no opportunity for the Financial Member of Council to make the Budget statement which, in former years, under less fortunate circumstances, used to be looked for with so much anxiety. I do not regret that the necessity for annual Budget discussions has ceased to exist. On the contrary, I look back with satisfaction to the fact, that no fresh taxes have been imposed during the past three years; and I agree with the high authorities who hold that the annual discussions were open to the objection of raising apprehensions of additional taxation, or at least of leading the public to expect changes every year in the financial arrangements of the State. Such changes in England are well understood and regarded without apprehension, but in India they are liable to be exaggerated and to disturb the minds of the people. There are none of the constitutional reasons for annual discussions which exist in England, and the consideration of financial measures by this Council only when the necessity for them arises is, in my opinion, both more in accordance with our functions, and more calculated to maintain the stability of Indian finance than such annual discussions.

"While, however, there have been no annual Budget statements in this Council for the last three years, there has been no concealment as to the state of our finances. The Government of India has always pursued the wise course of giving the fullest publicity to everything relating to the financial condition of the State, and we publish with the most ample explanations our annual estimates and accounts, together with every other information which bears upon trade and finance.

"In order to place before the Council, as clearly as I can, the present financial condition of India, I will take the statistics of the four last financial years, beginning with the year 1871–72, and ending with the year 1874–75. For the first three years, we have the final accounts, and for the last, we have what are called the 'Regular Estimates,' which usually approach very closely to the actual results. I will first compare the ordinary revenue of each year with the ordinary expenditure, omitting the charge which we have had to defray on account of the Bengal famine, and omitting also the expenditure which has been incurred in the construction of railroads and irrigation works, which, in the accounts, are classed as 'Extraordinary.'

"The revenue exceeded the expenditure in the year 1871–72 by 3,124,177 *l.*; in the year 1872–73 by 1,765,672 *l.*; in the year 1873–74 by 2,071,937 *l.*; and in 1874–75 it is estimated to exceed the expenditure by 1,889,000 *l.* In the four years, therefore, there appears upon the face of the account to have been a surplus of revenue over expenditure of no less than 8,850,786 *l.*

"These figures, however, present the account in rather too favourable a light. Certain deductions, with the reasons for which I need not trouble the Council, should be made from the revenue in order to show the correct balance between income and expenditure. I calculate these deductions to amount in the four years to 1,738,253 *l.*, but, after making them, the surplus still amounts to the goodly sum of 7,112,533 *l.*

"The expenditure upon famine relief in 1873–74 was 3,864,673 *l.*, and the estimated expenditure for 1874–75 is 2,442,000 *l.*, giving a total of 6,306,673 *l.* After charging the whole of this expenditure against the ordinary revenue of the four years, there remains a surplus of 805,860 *l.* I am informed that the accounts for 1874–75 will probably show a larger increase than usual over the Regular Estimate, and we may confidently anticipate that, after defraying the famine charges, there still remains a surplus of revenue over expenditure in the four years of not less than a million sterling,

"In a Resolution of the Government of India last year we expressed our opinion that, 'besides a fair surplus of income over ordinary expenditure, such a margin should be pro-'vided as would constitute a reasonable provision for meeting occasional expenditure upon 'famines.' The financial history of the last four years shows that such a margin has been amply provided. We have met a very large expenditure for famine relief out of the ordinary revenue of four years, with a substantial balance besides. It may interest the Council to know that when a calamity of the same kind fell upon Great Britain, in consequence of the failure of the potato crop of Ireland, only two millions out of a total expenditure of about ten

ten millions was defrayed from ordinary sources of revenue, the remainder having been raised by loan and not appearing, according to the best information I can obtain, in the accounts of ordinary income and expenditure.

"In several Despatches which successive Secretaries of State have addressed to the Government of India on the subject of finance, a desire has been expressed—more, I think, in the nature of a hope than of a confident expectation—that the Indian finances might show an annual surplus of more than 500,000 *l.* It will be seen that our surplus in four years has amounted to 7,000,000 *l.*, or more than three times the sum which the Home Government has desired.

"This satisfactory result, moreover, has been accompanied by a considerable remission of taxation. In the year 1873, the income tax, which during the preceding two years had produced a net sum of 1,362,570 *l.*, was allowed to lapse. The Southern Customs Line, which drew its long and obstructive length of 800 miles across Central India, has been abolished at a considerable sacrifice of the salt revenue; and yet in each of the last two years we have realised a very substantial surplus.

"Our cash account for the four years we are examining is given in a statement which is in the hands of Members of Council.

"The cash balance in India and England stood on the 1st of April 1871 at 20,174,715 *l.*, and it was estimated to stand on the 31st March 1875 at 18,386,198 *l.* We have spent in the four years on Public Works Extraordinary 11,401,351 *l.*, the balances of the Guaranteed Railway Committee have been diminished by 1,212,466 *l.*, a disbursement which is of the nature of a reduction of debt, and we have lent to Native States, Municipalities, &c., 1,570,231 *l.*, which we shall eventually recover, and which in the meantime has been of great benefit to those whom we have assisted. These disbursements, amounting together to 12,613,817 *l.*, have been met as follows:—By diminution of cash balances, 1,738,517 *l.*; by surplus of revenue over expenditure, 805,860 *l.*; by excess of receipts over disbursments on the sundry accounts which are embraced in our cash transactions, 2,103,007 *l.*; and by net increase of debt, 9,536,664 *l.*; an increase which is considerably less than the sum spent upon Public Works Extraordinary.

"The terms upon which loans have been raised in India and England in 1874, and in India in June last, are as follows:

> "In 1874—Five millions sterling were borrowed in England at 101 *l.* 7 *s.* 11½ *d.* for 100 *l.* stock. Two and a half crore of rupees were borrowed in India at *Rs.* 102. 12. 2. for 100 rupees stock.
>
> "In 1875—Two and a half crore of rupees were borrowed in India at *Rs.* 102. 3. 8. for 100 rupees stock.

"These terms afford a proof of the high estimation which is entertained of the credit of India in the money market, both here and in England.

"The cash balances in India were estimated to amount at the beginning of the present financial year to 15,700,042 *l.* This is held by some to be too high an amount, and the business of the Government could certainly be transacted with lower balances; but I do not consider them to be excessive, considering the magnitude of the liabilities to which the Government is exposed, and the difficulty that would be found in suddenly increasing our means in case of need. India is in this respect very differently situated from England. London is the centre of the banking business of the world, and in England the Chancellor of the Exchequer can, if he pleases, safely reduce his cash balance to the amount which is just sufficient to meet the business of the day; but the money market of India is very limited, and it would be hazardous to rely upon it for temporary assistance if a sudden demand should come upon the State, particularly such a demand would almost certainly occur at a time when there would be a pressure for accommodation on the part of the public. The condition of the Calcutta money market in the beginning of 1873, when considerable funds had to be suddenly supplied to pay for rice from Burma and elsewhere, sufficiently indicated the risk which would be run by reducing our cash balances too low. I entertain a strong opinion that a substantial cash balance over and above what is absolutely required, although it involves a considerable annual cost from loss of interest, is essential to the security of the finances of India.

"The Council will, I think, desire to consider to what causes the satisfactory condition of our finances is to be attributed. First I will observe, that great improvements have been effected of late years in our estimates and accounts. Unless estimates are carefully framed, and accounts promptly and accurately rendered, a Government is liable to fall into difficulties without any warning. Nothing can be better than our present system of estimates and accounts, and I am sure Sir Richard Temple will confirm me when I add, that the chief credit for this improvement is due to Mr. Chapman, the Financial Secretary to Government.

"The sound condition of our finances, in my opinion, mainly results, on the one hand, from the gradual increase of the revenue in consequence of the increased wealth and prosperity of the country, and on the other, from the exercise of strict economy in every department of the State. Both these subjects are so important that it is worth while to illustrate them by a few figures.

"We have sources of revenue which mainly depend upon circumstances other than the progress of the wealth and prosperity of India. Our opium receipts depend upon the supply of the drug, and the demand for it in China. Although our land revenue, taking a term of years, depends upon the increased wealth of the country, yet the increase arises from

Appendix, No. 5.

time to time as existing settlements expire, and it would be difficult without going into lengthy explanations to exhibit any comparative statement that would be of value for my present purpose. I will therefore confine myself to the revenue derived from Customs, Salt, Excise, and Stamps, all of which mainly depend upon the general prosperity of the country. I take the net receipts from these taxes since the years 1870–71, because alterations were made in 1869 in the Salt and Stamp Laws, as well as in the tariff valuations, which would vitiate the comparison with former years.

"The average annual net receipts from Customs, Salt, Stamps, and Excise, in the three years from 1870-71 to 1872–73, amounted to 12,691,262 *l.* a year. In the years 1873–74, and 1874-75, the receipts rose to 13,035,857 *l.* a year. These figures exhibit an increase in the last two as compared with the first three of the five years of 350,000 *l.*, and this increase has taken place notwithstanding some remissions of Salt and Customs duties.

"On the other side of the account we have to meet expenditure, which depends but little upon the action of the Government of the day; for example, the interest of our debt, and the charge for superannuation and retired allowances. Taking the expenditure within the control of Government, namely, the cost of Civil Administration, Law and Justice, Public Works, the Army, and the Marine Service, I find that the average annual expenditure for the three years, 1867–68 to 1869–70, was 31,833,512 *l.*; for the three years, 1870-71 to 1872–73, 29,748,527 *l.*; and for the two years, 1873–74 and 1874–75, 29,331,793 *l.* The average annual expenditure upon these services during the last two years, is therefore less by two millions and-a-half than it was six years ago, and less by rather more than 400,000 *l.* than it was three years ago.

"These figures show that while, on the one hand, the revenue steadily increases, although not at a very high rate, on the other, the expenditure has been carefully supervised by the Government.

"I can say this without scruple, because the result is mainly due to the attention which was paid to the control of expenditure while Lord Mayo was Viceroy, and it was the constant care of Sir Richard Temple during the time he filled the office of Financial Member of Council. The exertions of the Government have been cordially seconded by the several departments of the Government of India, by the local Governments, and by all the officers concerned throughout India; and the thanks of the Government of India are due to them for their valuable co-operation.

"While such has been the result of the Imperial finance of the past four years, the Government have not neglected the subject of provincial taxation. In 1872 circulars were addressed to the different local Governments, and the opinions of officers, both English and Native, were obtained respecting the effects of provincial and local taxation. The answers showed that there were at that time some taxes which were productive of discontent, and which might with advantage be discontinued. In the Madras and Bombay Presidencies the taxes to which most objection was then taken have been readily abandoned by the local Governments. In the Central Provinces the Pándhari tax—a direct tax which was extended over a very large number of people—has been greatly modified. The only new measure of provincial taxation which has since been carried into effect is the road cess in Bengal, a proper and legitimate impost, which, owing to the care which has been taken by Sir George Campbell and Sir Richard Temple to apply it gradually and cautiously to the different parts of the province, is being levied without difficulty, and applied to the advantage of the people who have to pay it.

"The Council will have observed that in the remarks which I have hitherto made I have only cursorily alluded to what is termed "extraordinary" expenditure. This, however, is a part of our annual expenditure of great importance, a notice of which cannot be properly omitted in any review of the finances.

"I have seen it observed that we have in the last few years 'drifted back into a condition of chronic deficit,' and that the expenditure upon railroads and irrigation works has greatly increased. This misconception may, perhaps, have arisen from the manner in which the account of our annual revenue and expenditure is published. What is called the 'extraordinary' expenditure is added to the ordinary expenditure of the year, and the result appears at the bottom of the account. Those who have made a study of the accounts are able to appreciate the real facts of the case, but they are not unlikely to be misunderstood by others who have not had time or opportunity for such a study. If the expenditure upon works such as railroads, which are of too great magnitude to be paid for altogether out of the ordinary resources of the Government, and which are in the nature of investments of capital, be added to the ordinary expenditure, the result must be a deficit. But expenditure upon such works belongs to an entirely different category from the ordinary expenditure of the State, and ought to be excluded in drawing a balance between income and expenditure for the practical purpose of showing the real surplus or deficit of the year.

"In England works of this kind are carried out by private enterprise without the aid of the State; in India this has been found to be impossible. The works themselves are essentially reproductive, in the broadest sense of the term; I mean that whether or no they may pay the full interest on the capital invested, they certainly add to the general wealth of the country, and moreover, in my opinion, they will directly or indirectly recoup to the State the full interest on the capital expended in their construction. Whether the capital be raised by giving a guarantee by the State of a fixed rate of interest to private companies, as has been done in the case of what are termed 'guaranteed railroads,' or the capital be borrowed by the State and the works carried on by the agency of the officers of the Government, is, so far as the finances are concerned, one and the same thing.

"In

"In order, therefore, to institute a correct comparison between the expenditure on such works in recent years, and the expenditure which formerly prevailed, it is necessary to add the expenditure of guaranteed railroad capital to the direct expenditure by the State. I have had a return prepared showing the sum spent annually upon railroads and irrigation works, both from guaranteed capital and directly by the State, and I will give the Council the results shown by that return. In the four years from 1867-68 to 1870-71, the sum of 25,330,518 *l.* was spent by Government and from guaranteed capital together, which gives an average annual expenditure of 6,332,629 *l.* In the four years from 1871-72 to 1874-75 there was spent from similar sources a sum of 16,647,871 *l.*, which gives an average annual expenditure of 4,161,967 *l.* The annual rate of expenditure, therefore, during the last four years has been less than by more than two millions than that of the preceding four years.

"But it is of more consequence to consider whether the expenditure which has hitherto taken place has been wise, and whether, although its rate may be diminished, it is at the present time within the resources of the Government.

"The answer to the first question is supplied by the steady progress of the national wealth since the policy of pushing forward railways throughout India was adopted in the time of Lord Dalhousie, and by the sound and satisfactory condition of our finances. In reply to the question whether our present rate of expenditure is within our resources, I need hardly do more than remind the Council of the careful forecasts which have been published showing the calculations upon which the present rate of expenditure has been determined. We considered that, however advantageous the extension of railroads or irrigation works might be, it would not be right to carry them on at such a rate as would require the imposition of fresh taxes, and the rate of expenditure has therefore been based upon calculations showing that any additional interest for which we may be liable on account of money borrowed for the purpose of constructing railroads and canals, will be met from increased receipts derived from works which have been, or will from time to time be, completed and brought into operation. The calculations originally made in 1873 were carefully checked this year, and the Government have no doubt of their substantial accuracy.

"I may observe, moreover, that we are now in a far better position than we have been at any former time in respect to our liability for the completion of railroads and irrigation works.

"So long as the main lines of communication, such as the East Indian and the Great Indian Peninsula Railways, were in progress, a very large liability rested upon the Government for their completion, a liability which, as those railroads were constructed by guaranteed companies, could not be set aside whatever financial exigencies might arise. Now that the principal lines of communication are completed, and the works under construction are of a more limited character, this liability for the future expenditure necessary to complete works under construction is considerably diminished. The rate of progress, moreover, is now almost entirely at the command of Government, because the works are mainly constructed directly by the State, instead of through the agency of guaranteed companies. I believe that in the course of a few years our liability will never at any time much exceed the annual sum which is appropriated to the construction of such works. Thus, in the case of a failure of any great branch of our revenue, or if other calls, such as those of war, should fall upon the Government, we should be able within a very moderate time to contract our expenditure without subjecting the country to the loss which would be occasioned by abandoning important works before they are brought into remunerative operation.

"I have one more remark to make upon this subject. Although the Government, rightly in my opinion, preferred the more expensive mode of construction of the Indus Valley Railroad, in order to complete a very important trunk line upon the broad gauge, we feel that the utmost possible economy should be observed in the construction of public works in India. We are, therefore, carrying out the narrow gauge system of railroads for the minor lines of communication; we reconsidered a few years ago the schemes of irrigation works which were then before us, and abandoned, for a time at any rate, works which were projected at an estimated cost of not much less than nine millions sterling. We have recently, in discussing the projected irrigation works for Behar, impressed upon the Government of Bengal, and upon the engineer officers who were engaged in making the plans, the necessity of carefully considering certain minor works which will probably be sufficient for the purpose in view, in lieu of more ambitious schemes which, however creditable they may be to their constructors, are not likely to be remunerative, and indeed are not unfrequently accompanied by serious drawbacks to the advantages which irrigation undoubtedly confers upon most parts of the country."

Appendix, No. 5.

STATEMENT showing the REVENUE and ordinary EXPENDITURE of the GOVERNMENT of INDIA in India and in England for the Four Years from 1871-72 to 1874-75, the EXPENDITURE for FAMINE RELIEF in the Years 1873-74 and 1874-75, and the SURPLUS upon the whole ordinary Account.

YEAR.	Revenue.	Expenditure.	Surplus.
	£.	£.	£.
1871-72 - - - - - - - -	50,110,215	46,986,038	3,124,177
1872-73 - - - - - - - -	50,219,489	48,453,817	1,765,672
1873-74 - - - - - - - -	49,611,711	47,539,774	2,071,937
1874-75 (Regular Estimate) - - - -	50,070,000	48,181,000	1,889,000
Total - - - £.			8,850,786
*Deduct receipts not ordinary revenue - - - -			1,738,253
Surplus, excluding Famine Relief - - - -			7,112,533
		£.	
1873-74 (Expenditure on Famine Relief) -	—	3,864,673	
1874-75 (Regular Estimate) - - -	—	2,442,000	
Total Famine Relief - - - £.			6,306,673
Surplus upon the whole ordinary Account for the Four Years, including Famine Relief - - - - - - £.			805,860

* These receipts consist of transfers from Military Funds, 1,315,495 *l.*, and loss by exchange saved by borrowing in England (net) 422,758 *l.*

R. B. Chapman,
Secretary to the Government of India,

Financial Department,
Simla, 4 August 1875.

ABSTRACT of the RECEIPTS and DISBURSEMENTS of the GOVERNMENT of INDIA in India and in England from 1871-72 to 1874-75.

RECEIPTS.	£.	DISBURSEMENTS.	£.
Cash balance 1st April 1871 -	20,124,715	Public Works Extraordinary -	11,401,351
Surplus upon the ordinary Account, 1871-75 - - -	805,860	Guaranteed Railway Capital repaid - - - - -	1,212,466
Sundry accounts - - -	2,103,007	Loans to Native States, &c. -	1,570,231
Borrowed - - - - -	9,536,664	Cash balance 31st March 1875 (Regular Estimate) - -	18,386,198
£.	32,570,246	£.	32,570,246

R. B. Chapman,
Secretary to the Government of India.

Financial Department,
Simla, 4 August 1875.

Appendix, No. 5.

STATEMENT showing the EXPENDITURE of GUARANTEED RAILWAY CAPITAL and upon PUBLIC WORKS EXTRAORDINARY in each Year from 1861-62.

YEAR.	Guaranteed Railway Company.	Public Works Extraordinary.	TOTAL.
	£.	£.	£.
1861-62	6,602,212	- - -	6,602,212
1862-63	5,863,344	- - -	5,863,344
1863-64	4,755,653	- - -	4,755,653
1864-65	4,122,240	- - -	4,122,240
1865-66	5,636,866	- - -	5,636,866
1866-67 (11 months)	7,297,703	- - -	7,297,703
1867-68	7,120,081	602,462	7,722,543
1868-69	4,481,898	*836,073	5,317,971
1869-70	4,742,851	*2,612,663	7,355,514
1870-71	3,776,270	*1,158,220	4,934,490
1871-72	2,496,728	1,628,474	4,125,202
1872-73	477,245	2,184,569	2,661,814
1873-74	970,131	3,553,307	4,523,438
1874-75 (Regular Estimate)	1,390,467	*3,946,950	5,337,417

* These figures differ from the amounts charged in the Finance and Revenue Accounts by the sums that were paid in those years for the purchase of the Calcutta and South Eastern Railway. These latter sums have been deducted because they are included in the expenditure of Guaranteed Railway Capital, viz. :—

———	1868-69.	1869-70.	1870-71.	1874-75.
	£.	£.	£.	£.
Public Works Extraordinary, per Finance and Revenue Accounts - -	1,370,613	2,599,614	1,167,810	4,035,000
Less for Calcutta and South Eastern Railway - - - - - -	534,540	—13,049	9,590	88,050
£.	836,073	2,612,663	1,158,220	3,946,950

R. B. Chapman,
Secretary to the Government of India.

Financial Department,
Simla, 4 August 1875.

Appendix, No. 6.

PAPERS handed in by Lord *Northbrook*.

Appendix, No. 6. REVIEW of the Progress of IRRIGATION SCHEMES in relation to FAMINE ASPECTS, by Colonel *F. H. Rundall*, R.E., Inspector General of Irrigation Works.

IN reviewing the progress which has been made with the various irrigation schemes throughout India, and the extent to which at this time they are capable of affording protection against famine, it will be most convenient to examine first the present condition of the respective Provinces of the Empire in their geographical order, and afterwards the relative urgency of their further requirements. Commencing with the Punjab, the first tract of country which continually suffers from drought is the Yusufzai Plain, on the left bank of the River Swat. The investigations for this small scheme are, I believe, complete, and the estimates ready for submission.

2. The plain is situated in the extreme northern corner of the Empire, approachable only by unmetalled roads from Nowshera and Peshawur. It is thinly populated; but on the right bank of the same river, where a system of native works has been in operation for many years, there is now every sign of prosperity, and a formerly turbulent set of freebooters have settled down into a peaceful community of agriculturists. The project on the left bank of the same river will, it is hoped, produce similar results. The estimate I believe, amounts to between 150,000 *l.* and 200,000 *l.*

3. Proceeding along the frontier, the next irrigation met with is in the Bunnoo Valley, where there are a series of old native works, the management of which is left entirely in the hands of the villagers under the general supervision of the district officers, and should continue so, the canal officers only affording help and advice whenever it may be necessary. Following the course of the right bank of the Indus, the first canals met with are a series of inundation canals watering the lower part of the tract known as the Derajat. For the improvement of this series, investigations have been going on some years, having originated from political, perhaps, as much as from fiscal considerations.

4. The next tract of country for which a scheme is in course of investigation is the Sind-Sagur Doab, lying between the Indus, Jhelum, and Chenab. It is almost a rainless country, and but thinly populated. The principal means of carriage available are camels, except along the line of the Indus, on which, of course, there are plenty of boats; and to a certain extent the Chenab may also be said to be navigable. These two rivers, however, only skirt the tract which is 250 miles long, with an average breadth of 50 miles. The project in process of investigation is a canal from the Indus to be taken out from below the gorge at Kalabagh.

5. The next two tracts of country as yet unprovided with any works are the Jetch and Rechna Doabs, comprised between the Jhelum, Chenab, and Ravee. For the first, comprising 3,000 square miles, no scheme has yet been worked out; but for the second, containing 12,000 square miles, one has been intermittently under investigation for some years. The Northern State Railway from Lahore will pass through both these tracts, but with that exception, ordinary roads only are available, the Chenab being navigated with difficulty. In the Baree Doab, the tract lying between the Ravee and the Beas, the upper portion for 160 miles from the foot of the hills may be said to be protected from famine by the canal which takes off the Ravee at Madhopoor. The two main branches to Kussoor and Sobraon are now in course of completion.

6. The Sindh, Punjab, and Delhi Railway runs across this Doab, the Trunk Road between Lahore and Ferozepoor intersects it lower down, but there is scarcely any water-carriage available at present, as the Sutlej is only navigated with difficulty. In the remodelling scheme of the Baree Doab, which is now before the Government of India, navigation, has, however, been provided for.

7. For the protection of the lower portion of this Doab, a complete scheme of canals to be taken off the Sutlej near Ferozepoor was designed and estimated, but owing to its cost and the sparse population of the tract, it was decided that, for the present, the project was to be confined to enlarging the present system of inundation canals in such manner as to work into the complete scheme hereafter. At its extreme end there are several of those canals

canals from both the Chenab and the Indus, watering about 1,000 square miles. The area of the whole tract is about 13,000 square miles, of which 9,000 are as yet unprovided with means of irrigation, while the principal means of communication is confined to the railway from Lahore to Mooltan.

8. Crossing the Sutlej, the first tract met with is the Jullundur Doab, which is usually considered as not standing in need of canal irrigation, because water is met with generally near the surface, and the soil is of known fertility. Beyond this, however, occurs an arid tract of very large area extending as far as the Jumna. For the protection of this area, the Sirhind Canal scheme has been devised and is now in rapid progress. The waters of the Sutlej will be conveyed by it up to the River Guggur. The area protected by the Sirhind Canal amounts to 8,500 square miles.

9. The present capacity of the Western Jumna Canal, which irrigates 500,000 acres, and may be said to protect 2,500 square miles, is, however, insufficient to provide water for one of the driest tracts in the Punjab, viz., Hissar and Sirsa, containing about 2,000 square miles. Whether it will be possible to devote any of the present cold weather supply of the Jumna to a canal for Sirsa is doubtful, but the possibility of conveying a monsoon supply has been considered, and a canal for that purpose must, I think, be eventually carried out.

10. The means of communication, apart from the ordinary roads, is confined at present to the Scinde and Punjab Railway, which traverses the upper part of this tract; there is as yet no water-carriage available, but in the Sirhind Canal Project, and in the remodelling of the Western Jumna Canal, navigation is provided for, and when all the connecting links have been made, there will be water communication from Lahore to the Jumna at Agra, and so with the river system of Bengal.

11. Assuming, then, that the area of the Punjab between the Indus and the Jumna amounts roughly to 56,000 square miles, it may be said that, while projects are either in operation or in course of construction sufficient to provide for 17,500 square miles, 38,500 square miles are as yet without means of irrigation, and but scantily provided with communications.

Thus—

	Sq. miles.
Protected:	
By Baree Doab Canal - -	3,000
By Jullundur Doab - -	1,000
By Sirhind Canal - - -	8,500
By Western Jumna Canal -	4,000
Inundation Canals - - -	1,000
Total - -	17,500
Unprotected:	
Sind Sagur Doab - - -	12,500
Jetch Doab - - - -	3,000
Rechna Doab - - - -	12,000
Baree Doab - - - -	9,000
Sirsa and Hissar - - -	2,000
Total - -	38,500

12. To the south-west of the Punjab lie the independent States of Bikaneer, Jeysulmere, and others comprised in the Rajpootana Agency, all of which have been the scenes of frequent distress from drought. With the exception of the small tract in Ajmere and Mhairwarra, which is British territory, there is no State expenditure on irrigation works. The State Railways recently projected in Rajpootana will intersect a considerable portion of it, and it is apparently on them alone that traffic there must depend, for the rivers in that tract are only spasmodically supplied with water.

13. The extension of the State Railway from Ajmere to Deesa to meet the Bombay and Baroda line from Ahmedabad would seem to be the only means by which food grains could be supplied cheaply from other localities to that arid region.

14. On the left bank of the Jumna the first portion of the territory of the North Western Provinces is the Ganges-Jumna Doab. The whole of this tract, comprising an area of 20,000 square miles, may be said to be thoroughly protected by the Eastern Jumna and the Ganges Canals, as far as the available cold-weather supply of those rivers will admit of irrigation. The principal means of communication are, the East Indian Railway between Allahabad and Delhi; the Ganges Canal, at present available from Hurdwar to Cawnpoor only, but to be eventually extended to Allahabad by the lower canal. The Doab itself is intersected also by numerous roads metalled and unmetalled; but cross lines of canal to connect the Ganges with the Eastern Jumna, and the latter with the Agra Canal, are required to make the water lines more useful and to ensure alternative routes being available in the event of any necessity occurring for closing a portion or the whole of either of the main lines. For this reason, the Futtehghur Branch should have been made navigable, for, had it been connected with the lower canal, it would have served to remedy any sudden suspension of traffic such as lately has taken place by the failure of the Salawa Lock. The additional cost of the navigation works for that branch was estimated at about 7,000 rupees per mile, or little more than is paid for the construction of ordinary metalled roads in the Doab.

15. The traffic on the Ganges Canal is now entirely confined to the canal itself, as at present there are obstacles to the free passage of boats in and out of the river at Cawnpoor. These obstacles ought to be removed and every facility given, for, until the canal is made perfectly accessible and connected with the great chain of river communication, a large part of its utility as a line of navigation is sacrificed. I believe Colonel Greathed is about to submit estimates for the necessary improvements, and these should at once be sanctioned.

16. On the left bank of the Ganges, and between it and the Ramgungo, lie the districts of Bijnour, Moradabad, and Budaon, occupying an area of 4,000 square miles. The first and third of these districts have always shared in a greater or less degree the famines which have overtaken the North Western Provinces.

17. The Eastern Ganges Canal project was designed for the protection of those districts, but final orders have yet to be passed thereon. The portion of the Oudh and Rohilkhund Railway, which runs from Bareilly to Moradabad, and the branch to Allyghur passing by

Appendix, No. 6.

Rajghât, are the only means of communication in addition to the ordinary roads. When the whole cold-weather supply of the Ganges has been drawn off at Rajghât, the navigation of that river as far as Allahabad will be closed until the supply is replenished during the rainy season. In view of this contingency, one branch at least of the projected Eastern Ganges Canal should be made navigable.

18. Bareilly and Eastern Rohilkhund also appear to have shared in the full severity of the five great famines of the present century.* The only means of irrigation existing there at present are a few small channels led off from some minor streams which issue from the Terai. There can scarcely be a doubt as to the necessity of providing some kind of permanent canal irrigation for that tract, and this would be best secured from the Sardah Canal whenever it may be found expedient to carry on that work.

* Viz., 1803–4, 1825–26, 1837–38, 1860–61, 1868–69.
Vide Reports by Messrs. Girdlestone and Henvy on Famines in the North Western Provinces.

19. Eastward of the North Western Provinces lies the Province of Oudh, for the upper districts of which, the Sardah Canal scheme provided. The central districts are considered to be sufficiently furnished with wells and other means of irrigation, but the lower districts of Benares and Goruckpoor, especially the former, have been frequently visited with drought, while Goruckpoor has this year come within the influence of the scarcity which has visited the neighbouring divisions of Bengal. There are good means of communication on the confines of these two districts in the Rivers Ganges and Gogra, while the lower portion of the Goomtee is also navigable. As yet no works of irrigation have been carried out in Benares and Goruckpoor. In the original complete scheme, the Sardah Canal would have irrigated Benares, but nothing has been hitherto proposed for Goruckpoor, as it was supposed to be sufficiently supplied with natural facilities for irrigation. There are no railways as yet, but if the contemplated connection of the Oudh and Rohilkhund system with the Northern Bengal State Railway be ever carried out, one line would run across the Goruckpoor district.

20. Turning to the districts belonging to the North Western Provinces on the right bank of the Jumna, the Agra Canal, which has lately been opened, will furnish irrigation to about 300,000 acres, and protect a strip of country averaging 20 miles wide parallel to the river. Beyond this to the south-west lie the districts of Bundelkhund, a tract which has been desolated over and over again, and which all accounts go to show is in a most depressed condition. It is traversed by three considerable streams, the Betwa, Dussan, and Keyn, which have all been investigated, and orders have been issued for the preparation of a project from the Betwa. It is absolutely necessary that irrigation should be provided as early as possible for this tract; but as the rivers are spasmodic in their action, and carry but a small volume in the cold weather, it is necessary that their waters be utilised principally for the autumn crop.

21. There are no means of communication beyond the ordinary roads, and, therefore, in my reviews of the schemes for Bundelkhund, I urged the importance of not neglecting to provide a small line of navigation, which, being connected with the Jumna, would enable produce to be conveyed in the cheapest manner from the Doab and the districts to the southward. Mr. Ricketts' Reports on Bundelkhund have forcibly brought to light the necessity for works both of irrigation and communication, and pointed out the losses which have accrued to Government, both directly and indirectly, for the want of such works.

22. Lastly, the district of Mirzapoor, on the right bank of the Ganges, has felt the effects of drought simultaneously with the adjacent province of Behar, but for that portion of it through which the Western Main Canal of the Soane Project must be carried, irrigation and communication can both be provided. The terminus of that Canal should be at Mirzapoor. Beyond that place I think it will be feasible to supply a connecting link with the terminus of the Lower Ganges Canal at Allahabad from the River Tonse. This line has not as yet been investigated, but if found to be practicable at a reasonable expense, it is a work which should, without doubt, be carried out. The East India Railway runs through the lower portion of the district which borders the Ganges.

23. Summarising, then, the condition of the North Western Provinces, it may be said that, out of a total area of 40,000 square miles, 25,500 square miles are protected with works of irrigation, 4,400 square miles are partially provided with improved communication, but have need of a more permanent system of irrigation works, and 9,800 square miles are wholly destitute of both.

Thus—

	Square Miles.	
Protected:		
Ganges-Jumna Doab -	20,000	
Agra Canal - - -	3,000	
With partial Irrigation:		
Part of Rohilkund - -	2,500	
		25,500
Partially provided with Communications, but with no Irrigation Works:		
Benares and Goruckpoor	- -	4,400
Wholly unprovided with either:		
West Rohilkhund - -	4,000	
Mirzapoor - - -	800	
Bundelkhund - - -	5,000	
		9,800
Total - -		39,700

24. Proceeding southwards, the first province met with in Bengal is Behar, where the scarcity of the present year has told with the most severity. The frequency with which this province has been subjected to droughts led to the projection of the scheme of canals from the Soane, by means of which all Shahahbad, Behar, the tract between the Kurumnassa and the Ganges, and a portion of Gya and Patna as far as Monghyr, will be thoroughly secure as far as the rice crop is concerned, while for the spring crop there is water in the Soane itself for about half the acreage that can be brought under cultivation throughout the 7,500 square miles under command of the canals, and by a judicious storage of the minor streams, probably a considerable further area of the cold-weather crops may be supplied with irrigation.

25. The

25. The provision of navigation works in these canals will further secure intercommunication amongst all parts of the province, and as all the various lines of canal will be connected with the Ganges, South Behar will always be accessible to the entire river systems of Bengal, the North Western Provinces, and Oudh. Besides this, the East Indian Railway skirts the extremity of the Patna and Shahabad districts.

26. For Northern Behar, two similar schemes have been thoroughly investigated and designed, but as yet no work has been actually carried out thereon. Recently, however, orders have issued for a commencement of the High Level Canal from the Gunduck along the frontier of the Chumparun District as far as the River Bagmuttee, but the scheme for Lower Tirhoot still remains in abeyance.

27. The existing means of communication are principally confined to the ordinary roads, scarcely any one of which are metalled.

28. The Gunduck is navigable for boats of light draught during the cold weather for a distance of 70 miles, or as far as Govindgunge. Boats also find their way during the rains by the tortuous route of the Bagmuttee and Boor Gunduck as far as Mozufferpoor.

29. The Government has, I believe, under contemplation a system of State railways throughout the entire tract of country north of the Ganges, by which the Oudh and Rohilkhund system will be connected with that of Lower Bengal, and in so far as that may be carried out, the intercommunication of the various districts will to a great extent be secured, but I would earnestly press upon Government the desirability of at the same time not omitting to render the canal system of North Behar navigable similarly to that which is being carried out on the Soane scheme, for the districts to the north of the Ganges are under precisely similar conditions as those of the south in relation to the great river system of Bengal. The additional cost of the works necessary to make the canals in North Behar navigable will be much less than in those from the Soane, owing to the gentler slope of the country and the larger volume of water continuously available, whereby the necessity, and consequently the extent and expense of resorting to still-water navigation are considerably reduced.

30. The peculiar advantages attendant on water-carriage and its suitability to the circumstances of India generally, and to Bengal in particular, will be explained further on in this note, and, therefore, I will only state here that it enables the mass of the population to effect what no other means of transit can accomplish, and that is to carry on an interchange of food-grain and every other commodity perfectly independent of extraneous assistance either from the Government or the European capitalist; and is thus calculated to regulate, especially in times of scarcity, the food supply with the least disturbance of the ordinary operations of trade.

31. The Patna Division comprises about 23,700 square miles. Of that area, the Soane scheme will thoroughly protect 7,500 square miles south of the Ganges, leaving 16,200 square miles yet to be provided for, of which the two Gunduck schemes would protect 5,000 square miles more.

32. Eastward of the Bagmuttee, and between it and the Koosi, are the estate of Durbungah and the northern districts of the Bhaugulpoor Commissionership. These appear to have always suffered in common with the districts of Behar, and are this year in the centre of the severest scarcity. Durbungah being at present under the court of wards, has its public works managed by a special officer attached to the estate, but it might be brought within a comprehensive system which seems feasible from the River Koosi, and which could be arranged so as to work in with, and be connected with the Gunduck system.

33. The Koosi is a snow-fed river, and carries at all times a considerable volume of water. Nothing that I am aware of has ever been attempted in the way of improving the river as regards navigation; neither has any effort been made to utilise its water for irrigation purposes. The area contained in this tract measures about 6,000 square miles, and may be said to be at this present time without any communication beyond the ordinary unmetalled roads. The State railway lately commenced from Chumpta Ghât on the Ganges to Durbungah will, when complete, be the first improvement in the communications of this tract.

34. Between the Koosi and the Bramahpootra, lie the districts of Dinagepoor, Maldah, and Rungpoor, occupying an area of 17,700 square miles, and all affected to a greater or less degree by the drought of this year. The normal agricultural condition of these districts has hitherto been so good, that nothing in the way of artificial irrigation has ever been considered necessary. They are traversed by many streams, amongst which are two very considerable rivers, the Mahanuddy and the Teesta, both of which, being snow-fed, carry a large cold-weather volume. Of the possibility of improving them for navigation purposes, I cannot offer an opinion, as I am not personally acquainted with their capabilities, but the matter is well worth investigation, as also the practicability of leading out irrigation channels, if not for the rice, at all events for the spring crops.

35. The Northern Bengal State Railway will run through Rungpoor, and the contemplated connecting link with the Oudh and Rohilkhund Railway will traverse it as well as Dinagepoor at right angles, but until those works are carried out, the districts in question are, with the exception of the Ganges and Darjeeling Road, dependent on the ordinary country tracts.

Appendix, No. 6.

36. Between the Soane and Damooda, nothing has yet been attempted in the way of irrigation works. Intermediately lie the Southal Pergunnahs, which have been frequently visited with scarcity. The description of works suitable for this area of 5,500 square miles, would be a series of small tanks similar to those which are to be found all over the Madras Presidency, and which are scattered over the table land of Mysore. The several streams which now drain off into the Ganges, or into its minor tributaries, the More and Adjye, might thus be turned to useful account with, probably, a very moderate expenditure.

37. The Loop and Chord lines of the East India Railway skirt the extremity of these Pergunnahs, the greatest intermediate distance being about 100 miles. There are also various cross-roads intersecting them, and the Ganges flows past the north-east corner, so this tract is perfectly accessible, and there should be no difficulty in furnishing it with food when need so requires.

38. In the Commissionership of Burdwan, the districts of Hooghly, Burdwan, and Midnapoor, containing about 10,000 square miles, suffered badly in the great famine of 1866. Burdwan, besides having 10 inches less rain than Calcutta, is peculiarly liable to experience a failure of it in the end of September and beginning of October, just at the time when the rice crop is about to mature, and when an absence of rain is likely to imperil the entire crop. In both Hooghly and Burdwan this year, such a failure has occurred, and there has been a corresponding short out-turn in the harvest, except where by a timely supply of water given in a rude manner from the Damooda, a considerable area of cultivation was saved. An estimate for a small scheme from that river for leading water into the old channels of the Damooda running through Hooghly has been sanctioned, but this will not be of the slightest assistance to the Burdwan district, the upper portion of which is in much need of irrigation. The original comprehensive scheme of the Damooda Canal taken off from Raneegunge can alone furnish a supply to Burdwan, and by its connection with the River Hooghly, all the country through which it runs will be placed in communication with the rest of the river system. As regards communications, the lower part of the Hooghly District is traversed by natural tidal channels navigable by small boats. The Damooda itself is also navigated with difficulty during the rainy season as far as Raneegunge, but there are no means of access to the greater portion of Burdwan, except by the East Indian Railway, which skirts the right bank of the Damooda. An extension of the original canal project into the eastern part of that district, and a navigable branch of the town of Burdwan to the Hooghly at Culna, as suggested lately by Colonel Haig, would, without doubt, increase the usefulness as well as improve the financial aspect of the scheme.

39. The districts comprised in the Commissionership of the Presidency Division, viz., Nuddea and Jessore, embracing an area of 9,875 square miles, suffered badly, though in a less degree, than the western districts of the famine in 1866. In the present year it is believed that, beyond the pressure resulting from high prices, there will be no distress. The usual rain-fall in the Nuddea Districts is in most years sufficient to ensure the maturity of the rice-crop, but there is a considerable area of spring cultivation in various portions of it which has been hitherto entirely dependent on the winter rains, and for which there is little doubt canal irrigation would be always acceptable.

40. A scheme which was very thoroughly investigated and designed a few years ago, but which had for its principal object the construction of a first-class navigation canal from the Ganges at Sahibgunge with a view to accommodate the enormous traffic with Calcutta that now passes by the Nuddea rivers in the rains, but is obliged to take the circuitous route of the Sunderbunds for five months of the year, would furnish an ample supply of water for the cold-weather crops of Nuddea and Moorshedabad. This project, which was originally drawn up under my own orders while chief engineer in Bengal, has not been submitted to the Government of India, owing, I believe, to the magnitude of some of the works involved, but if anything is to be done for the improvement of the Nuddea Districts, or for giving increased facilities for the vast water-borne traffic to Calcutta, it can only be accomplished by such a project, or some modification of it. As regards means of communication, these districts themselves are well off as long as the rivers remain navigable. The Eastern Bengal Railway skirts the southern extremity of Nuddea, and the Nulhattee Railway runs on the west to Moorshedabad, while the Ganges is available for the eastward. The district is also well intersected with roads, so that in respect of furnishing supplies of food there could never be any difficulty.

41. Chota Nagpoor, which covers an extent of 43,900 square miles, with a population of three and three quarter millions, has not, that I am aware of, ever been properly investigated as to its capabilities for irrigation works. I am not acquainted with the tract of country myself, and, therefore, am unable to indicate exactly what steps should be taken; but I expect that something analogous to the tank system of Madras will be found suitable for Chota Nagpoor. The districts comprising it suffered in the great Orissa famine of 1866. Situated away from the line of navigable rivers, as well as from the East Indian Railway, the nearest point to which is on the Chord line, it is, perhaps, of all Bengal, the least accessible tract. A great portion of it is, however, uninhabited, and the population is stated to be somewhat under 90 to the square mile. How far it would serve as an outlet for the teeming districts adjoining it, in the event of facilities being afforded for cultivation by the construction of minor works of irrigation and by improved means of communication,

communication, I cannot say, but it is a matter worthy of consideration, and may, perhaps, have already engaged the attention of the Bengal Government. Appendix, No. 6.

42. The chief wants of the Eastern Districts of Bengal are improved means of communication, or rather of utilising the magnificent water-ways of which they are possessed. A canal from Dacca to near the confluence of the Ganges and Brahmapootra was lately proposed by the Government of Bengal, and as the cost was beyond the means of the provincial resources, a loan was asked for from the Government of India. I have no doubt of the expediency of the proposed work if properly carried out, but instead of stopping it at the Brahmapootra, I consider it should be carried on until it is connected with the present system of the Calcutta canals. The traffic from the eastern districts which now enter those canals is shown by the statement which accompanied the Goalundo Committee's Report, to have amounted in 1872–73 to one-and-a-half millions of tons, or, after deducting 800,000 tons of firewood, to three times as much as was carried by the Eastern Bengal Railway, notwithstanding that it has to follow a most circuitous, and, at certain seasons of the year, a somewhat dangerous route. This large traffic certainly deserves more attention than it has yet received, and there can be little doubt but that if a more direct and perfectly safe route were secured for it, it would largely increase and would repay the interest of such outlay as the improvement of the route might entail, for the saving in distance and risk would be much more than sufficient to enable the boat-owners to pay the canal tolls.

43. The remaining portion of Bengal is the Province of Orissa, with which the Midnapoor District may properly be considered. Exclusive of the Tributary Mehals and Midnapoor, it contains 7,700 square miles. The security of this province from any further visitation of famine can only be effected by the completion of the Orissa scheme in its integrity. The works hitherto constructed, or in progress, will secure the northern portion of the Mahanuddy, Brahminee and Byturnee Deltas, an area of 1,200 square miles.

44. The Midnapoor Canal, which is in operation throughout its whole length, protects the tract of country between the Cossye and the River Huldee, an area of about 600 square miles.

45. There yet remain to be provided for, the Central and Southern Deltas of the Mahanuddy, the high level tract from the Salundee to Balasore, that portion of the Balasore District between the Balasore River and the Subanreeka, and so much of the Midnapoor District as is contained between the rivers Subanreeka and Cossye.

46. The gross area of these several tracts amounts to 2,700 square miles, as marginally shown.

	Sq. miles.
1. Central Delta - - - -	500
2. Southern Delta - - -	650
3. High-level tract to Balasore -	600
4. From Balasore to the Subanreeka	300
5. From the Subanreeka to Midnapoor - - - - -	650
Total - -	2,700

47. There is not the slightest doubt that any one of these sections of Orissa, if visited by another drought, will suffer severely. The estimates for the Central Delta Sections are ready with the superintending engineer, and only require the sanction of Government to admit of their being carried out and completed in a couple of years. The details of the Pooree Section have not yet been finally settled. With the Northern and Central Deltas fully provided for, any failure in Pooree could for the time, perhaps, be supplemented, as there would be sufficient food forthcoming, and the distances to which it would have to be transported would not be great; still the district suffers greatly from floods as well as drought, and urgently requires to be protected from both evils.

48. It would not, however, be so easy to supply the tract between Bhuddruck, on the Salundee, and Midnapoor, a length of 120 miles. Grain could, of course, be conveyed by sea to Balasore, but the entrance to its river is not easy during the south-west monsoon, and food would have to be conveyed by land from the two present termini of the High Level Canal.

49. The early completion, therefore, of these intermediate links is an urgent necessity, for it is not only the preservation of the country lying between that canal and the coast that has to be considered, but of the Hill tracts stretching away to the borders of Chota Nagpoor, and which are only accessible by roads from certain points on the line of the canal. The surveys of the fourth section of the High-level Canal between Bhuddruck and Balasore, which were on the eve of completion, have lately been suspended, and the officer engaged thereon transferred to Tirhoot. Those between Balasore and Midnapoor will probably require to be prepared anew, as it is many years since the original estimates were framed, and many of the designs then prepared have been mislaid. By carrying on work simultaneously from both ends, the completion of the canal and inland water communication between Cuttack and Calcutta ought not to occupy many years.

50. The length of navigable canals already in operation is about 210 miles, but the total length of connected navigation which these canals admit of being utilized by joining the natural tidal creeks and river estuaries at the mouth of the Mahanuddy, Brahminee, Byturnee, Hooghly, and adjacent rivers, cannot be less than 400 miles.

Appendix, No. 6.

51. In Bengal, then, out of an area of about 78,000* square miles, in which this year the crops have suffered more or less from scarcity of rain, about 12,000 only will be protected by the Orissa and Soane schemes.

* Thus—

	Sq. Miles.
Patna Division - - -	16,200
East of ditto to River Koosi -	6,000
East of Koosi to Brahmapootra	17,700
Sonthal Pergunnahs - -	5,500
In Burdwan Commissionership	10,000
In Nuddea District - -	9,900
Orissa - - - - -	7,700
Midnapoor - - - -	5,000
Total - -	78,000

52. In the Madras Presidency the two northern districts, Ganjam and Vizagapatam, generally known as the Northern Circars, have been frequently subjected to drought of more or less severity, the condition of Ganjam in 1866 being similar to that of Orissa. There are a number of small irrigation works scattered throughout it. The only contemplated new work of any importance is that called the Rooshkoolia Project, the designs and estimates of which are, I believe, under the consideration of the Madras Government. The District of Vizagapatam consists principally of the large estates of Vizianagram and Bobbili; the numerous irrigation works in which, consisting of tanks and small river channels, are all managed by their respective owners. There are no other means of communication in these districts beyond the ordinary roads, of which, however, there is an excellent system laid out and constructed for the most part during the scarcity of 1852–53, and as these all converge to the ports, of which there are several along the eastern coast, the Vizagapatam District can be always supplied without difficulty with grain from other localities. The Ganjam District, however, can best draw its supplies from Orissa *viâ* the Chilka Lake, with which the Pooree system of canals will be connected, and hence the requirements for Ganjam present an additional reason for pushing on with that portion of the Orissa scheme and completing the links yet wanting in the chain of water communication. South of Vizagapatam are the great Deltas of the Godavery and Kistna. The grand system of canals in the former is approaching completion, but that of the Kistna is still backward. As the two deltas are, however, linked together by an admirable chain of navigable canals, not only are they thoroughly protected from a recurrence of such a famine as that by which they were decimated in 1833, but they are able to contribute out of their abundance to the rest of India.

53. The completion of the Kistna scheme should, however, now be pushed forward, and not allowed to linger on as it has been doing for several years.

54. In the Nellore District, the Southern Pennair scheme is in operation, but a similar one, called the Sungum Project, estimated for the northern portion, has been recommended to the Secretary of State, and only awaits sanction pending the receipt of certain explanations called for by Her Majesty's Government. The required explanations having been furnished by the Madras Government, should be forwarded without further delay. The principal work of communication in connection with the littoral districts north of Madras is the East Coast Canal, the early extension of which from its present terminus is most desirable, as by its means the Deltas of the Godavery and Kistna, and the upper portions of the River Godavery, where the recently discovered coal measures are situated, will be connected with the railway system of Madras.

55. This canal extension, which has been under consideration for the last 20 years, does not appear to have yet got beyond the region of discussion, but it is a most important work, and should not be delayed.

56. The districts of North Arcot, Chingleput, and Cuddapah, are essentially dependent on tank irrigation, as well as those of Madura and Tinnevelly, where almost every drop of the small rivers which traverse them is stored in reservoirs, some of which are of considerable size.

57. Tanjore, part of Trichinopoly, and South Arcot are provided for by the Cauvery series of canals. There is but one line of navigation in the Cauvery Delta, and that very inferior, but the Great Southern Railway traverses the districts of Tanjore and Trichinopoly. Its northern terminus connects it with the South Western Line at Erode, and the extension of the Carnatic Railway will connect its southern extremity. The extension to Madura will link that district also with the Madras system. It was, I believe, originally contemplated to extend the East Coast Canal southwards as far as Negapatam, the port of Tanjore. It is to be hoped that this has not been abandoned, for it is likely to prove just as useful and important as the northern extension.

58. The district of Coimbatore is partly supplied by river channels and partly by tanks; that of Salem almost entirely by the latter. On the western coast, the State of Travancore manages its own works, and the two districts of Malabar and South Canara, enjoying the full influence of the south-west monsoon, are naturally well supplied with water. The Madras Railway skirts the boundary of the Malabar District and Travancore State, ending at the port of Beypoor. There is also a good inland navigation along a succession of backwaters parallel to the coast.

59. The Madras Provinces possess one great advantage from their geographical position. With an enormous length of coast line studded with ports, almost every district is accessible by sea, and the distances across the peninsula being but short in comparison with those of Northern India, the labour of transport should be a much less difficult task. Still, the distances from the interior to the coast are sufficiently long to add greatly to the cost of carriage of food-grains, the prices of which, generally speaking, range higher than in Northern India, and hence the desirability of carrying out such works as navigable canals and a system of cheap railways wherever feasible. Much of the advantage of the coast communication is, however, counteracted by the fact of there being so few harbours, and of vessels having to load and discharge their cargoes in open roadsteads, an operation attended with much difficulty in the south-west monsoon.

60. The Province of Mysore, whose administration is directly under the Government of India,

India, has, generally speaking, a small rain-fall, and hence it being necessary to store every available drop, it is principally dependent on an extensive system of tanks, the whole of which is at the present time being placed in perfect repair from the surplus funds of that State. The branch of the Madras Railway to Bangalore connects that large place with the general railway system, while the province is intersected with numerous excellent roads.

61. North of Mysore are situated the districts of Bellary and Kurnool, in both of which drought may be said to be the rule rather than the exception. The first-named district is studded with tanks, some of very large capacity, but all more or less dependent on local rain-fall. What is needed for its better security from drought is, a canal from the River Tumbuddra, the execution of which formed part of the Madras Irrigation Company's project, but which it seems scarcely probable they will have the means to accomplish within a reasonable period. The project is an expensive one, but unless carried out, the district of Bellary must remain always more or less dependent on the small and variable rain-fall which obtains in that part of the Peninsula.

62. In Kurnool, the Madras Irrigation Company's Canal, which is taken off the River Tumbuddra, will do all that is necessary for the monsoon cultivation; without storage, however, the supply in that river is insufficient to assist the cold-weather crops, and the Company is not allowed to draw off any water until the Government canals in the Kistna Delta are fully supplied. The construction of reservoirs is much required also, to maintain perennial navigation in the Company's canal, but it seems doubtful when they will be able to raise sufficient capital to undertake them. The extension of this scheme to meet the East Coast Canal is an important link in the communications which should be borne in mind. Whether this extension will be feasible as long as the works belong to the Company seems doubtful, but until it is carried out, the usefulness of the Kurnool-Cuddapah line of navigation will be very restricted. As soon as it is connected with the East Coast Canal, however, the central districts of the Peninsula will be placed in communication with the great Delta system to the north, and with Madras and the general railway system to the south.

63. The total area under irrigation in the Madras territories, according to the latest accounts, amounts to over $4\frac{3}{4}$ million acres.

* * * * * * *

64. So much of that large area as is supplied from rivers which are filled by the south-west monsoon may be considered secure, but that which is cultivated under tanks, dependent entirely on local rains, must of necessity be more or less precarious; for it there is no remedy beyond improving the communications so as to place such tracts within reach of those districts where the food supply is always secure. Hence the importance of the East Coast Canal and its connection with the inland districts wherever practicable. The works still required for Madras have been provided for in the forecast statement, with the exception of the East Coast Canal, Bellary project, and extension of the Kurnool Canal. There appears to be some technical difficulty in assigning loan funds for the Coast Canal, and therefore special grants should be made for it from the ordinary agricultural funds. The two others are still included in the limits of the Irrigation Company's scheme, and therefore, of course, could not be entered in the forecast. I shall, however, assume that the Bellary project will sooner or later have to be undertaken by the Government.

65. In the centre of the Peninsula lie the Nizam's dominions, and beyond them the Berars. In the latter, little has been done as yet beyond the investigation of small projects, but parts of Hyderabad are studded with very fine tanks. The branch of the Great Indian Peninsula Railway between Bhosawul and Nagpoor, runs through the centre of the Berars, and the line from Poona to the Kistna skirts a portion of Hyderabad, with the capital of which it is connected by a direct line from Gulburga.

66. To the north of the Nizam's territory lie the Central Provinces, in which no new irrigation works have as yet been carried out. Investigations have been made for three or four projects, but the very low rates which the revenue officers assert can only be levied for irrigation water will scarcely admit of securing adequate returns. These provinces, however, have generally shared in the droughts which have overtaken the North Western Provinces, and only as lately as 1868–69 suffered considerably. It is incumbent, however, therefore, that steps should be taken to meet the repeated deficiencies of rain-fall, and the best remedy will, I think, be found in the construction of a series of inexpensive tanks, such as those which abound in the neighbouring tracts of the Nizam's dominions. There are several rivers, feeders of the Godavery, from which a reliable supply of water might be obtained, and which would render the tracts of country under their command independent of the local rain-fall.

67. Two lines of rail at present traverse part of the Central Provinces. On the eastward River Manhanuddy skirts the districts of Chutteesghur and Sumbulpoor. A canal from a few miles above the latter place could be carried parallel to that river down to within reach of the navigable portion near Cuttack, and thus an outlet for those districts to the seaboard would be opened *viâ* Orissa, and irrigation be afforded on the way to a part of Sumbulpoor. This project was partly investigated by the officers of the East India Irrigation Company. But the most important line of communication for the Central Provinces is undoubtedly the River Godavery, the works for whose improvement have undergone the most unfortunate vicissitudes, and, after a large expenditure, have been left in just such a state as to obtain from that expenditure the least possible result. The completion even of

Appendix, No. 6.

the First Barrier Canal would utilise about 200 miles of the river, while the construction of the Second Barrier works would carry the navigation well into the Nizam's dominions, and to the outskirts of the populous portion of the Central Provinces. The completion of the communication to the latter, however, would procure for them, at the cheapest possible prices, the various food grains, salt, sugar, and other products of the fertile Delta districts, in exchange for their cotton and other products. The importance of the Godavery navigation has been so often and so forcibly urged by those best acquainted with it, that it would be superfluous for me to dwell on it further than to express my own belief, based on intimate personal knowledge of the river and its capabilities, that it is one of those lines of communication the perfecting of which will prove of the highest value to the tracts of country which will be connected by it.

68. In the Bombay Presidency both Khandeish and the Deccan are liable to droughts, but irrigation works are principally confined to small channels from the rivers or tanks. No large projects have been carried out there as yet, with the exception of the Kurruckwasla Reservoir near Poonah, and the Moota Moola canals leading therefrom, the Ekrook Tank near Sholapoor, and the canals from the rivers Krishna and Hathmuttee.

69. The Taptee project for the irrigation of Guzerat, the estimates of which are now before the Government of India, is the largest yet designed. Final orders have not as yet issued thereon.

70. The area under irrigation in the Bombay Presidency from all sources, excepting wells, and exclusive of Sindh, is somewhat under 150,000 acres. The works now under construction provide for a further area of only 176,000 acres, and if the Taptee project, commanding 194,000 acres, be added, the total area provided for would not exceed 370,000 acres. The present and prospective irrigated area in the Bombay Presidency proper being so small, would seem to indicate that cultivation was, as a rule, independent of it. From the new works in the Deccan, the progress of irrigation has certainly been very gradual, but this, no doubt, is partly owing to the expense and labour involved in an undulating country in preparing the fields for wet cultivation where hitherto only dry crops have been raised in sole dependence on the rains.

71. Whether owing to a difference in fiscal administration, or to other causes, the people in Khandeish and the Deccan seem better able to weather out seasons of scarcity, but they are, nevertheless, often exposed to droughts, and there are several minor schemes which will, no doubt, prove valuable to the tracts concerned. Some of these have been provided for in the forecast under the head of "Other Projects."

72. As regards communication, with the exception of the coasting trade, the traffic in Bombay is all dependent on land carriage. With its three lines of railway and their branches running through each of its principal territorial divisions, it has the means of importing food from other provinces at a comparatively low rate in times of scarcity, and with a coast line fringing almost its entire length; the task of supplying the Bombay districts with food, should the necessity ever arise, would be comparatively easy.

73. It only remains to describe the Province of Sindh. To all intents and purposes, Sindh is a perfectly rainless country, but as far as cultivation is concerned, this is partly compensated for in the magnificent river which flows through its midst, and which is capable of being led over every part of its Delta.

74. Hitherto, irrigation from the Indus has been confined to the season of the freshes simply because the canals which have been taken out of it are all on the inundation system, but seeing the enormous volume which it carries in the lowest season, seldom less than 60,000 cubic feet per second, it seems matter for regret that, where water is so valuable, so large a quantity should be allowed to run to waste to the sea, and that the cultivated area in Sindh should be limited to what can be raised during the inundation months, thus practically leaving the agricultural community without occupation during the remainder of the year. Colonel Fife proposed to remedy this defect by the construction of a system of perennial canals, for the first of which he designed a large canal from the left bank of the gorge at Roree, but the wholesale silting up of the Sukkur Canal on the opposite bank of the river raised discussions as to the possibility of keeping open the Roree Canal as designed.

75. There are certainly difficulties connected with the great deposit of silt in the Indus canals, but I believe they are not insuperable, and, seeing the advantages that would accrue from the cultivation of spring crops in a climate suited to the growth of wheat and similar cereals, I think the subject of perennial canals in Sindh should not be allowed to drop altogether. After a tour through Sindh I made suggestions by which the Eastern Narra Series might be converted into a perennial system, and if a commencement made with these is found to be attended with successful results, the general scheme could be extended hereafter. The irrigated area in Sindh this year amounted to 1,618,400 acres; in fact, without water, cultivation is impossible, and the only limit to the extension of canals is the population. Experience, however, on the canals constructed of late years from the Eastern Narra shows that immigration from the neighbouring desert tract of Jeysulmere quickly follows the introduction of water in any new locality.

76. The chief means of communication in Sindh is the River Indus, but this at present is unconnected with the Kurrachee Harbour, and now that the break-water there has been completed, and ships are beginning to resort to that port again, the connection of the Indus with

with that harbour is a matter of importance. There is also the railway from Kotree to Kurrachee, and its connection with Mooltan is also in progress, but some years must elapse before it is completed. When the extension of the Eastern Narra series is undertaken, not only should the main canal be rendered navigable, but at least one cross line should be carried from Oomerkote to the Indus at Hyderabad, as at present all traffic is dependent on camel carriage, which is very costly, and a high cost of transit is one of the disadvantages under which Sindh at present labours.

77. Having thus described the circumstances and existing conditions of each Province in their geographical order, it remains to examine how far their respective requirements, as regards means of irrigation and communication, for the two are inseparably connected, are met by the several schemes already sanctioned and in progress.

78. In the forecast of expenditure on irrigation works prepared last year, were entered all the schemes which have as yet been sanctioned either in whole or in part.

79. The estimates amounted in aggregate to 18,487,000 *l.*, and the estimated expenditure to the end of the current year, 1873-74, to 6,927,000 *l.* The actual outlay has been 6,255,411 *l.* There were also a certain number of projects entered as "contemplated," whose estimated cost was set down as 1,838,000 *l.*, and the expenditure on these, chiefly on investigation, was set down at 97,000 *l.* The actual outlay has amounted to 80,270 *l.*

80. Of the sanctioned schemes, I do not think that those in any one Province can be accelerated at the expense of those in another without prejudice, nay, even without danger to the locality in which the retarded works may be situated, unless it be the works in the Bombay Presidency, where the recurrence and pressure of scarcity seem to be less frequent and severe than in any other part of India.

81. If the relative amount of rainfall is alone to be taken as a standard by which the requirements of the respective provinces of India are to be gauged, then Sindh and the rainless tracts of Punjab in the north, and Mysore and adjacent districts in the peninsula, would stand first; but several other points have also to be considered, such as the degree of regularity of the actual rainfall, the staple food of each locality, and the quantity as well as the regularity of the supply of water required for its growth, the population dependent on such food, the accessibility of the locality from other provinces, the nature and extent of its communications, the cost of transit, and the ruling prices of grain and other produce. It will be at once evident that all these points must be considered together, and that, if precedence is to be given to any one part of India more than to another in providing an insurance against famine, irrigation works are most urgently required in those localities where the food of the people is dependent on a single crop, which is liable to be suddenly and seriously injured, if not altogether lost, by either irregularity, insufficiency, or too early cessation of the periodical rains, and where the population dependent on such crop is densest; for a failure in such a locality is liable to be entire, is much more difficult to contend with, more disastrous in its effects, and far more lasting in its consequences, than where the population is comparatively scanty, and is not wholly dependent on any single staple of food. Hence the famines in the North Western Provinces have been more intense than those in the Punjab, and those in Bengal, though less frequent, generally attended with more loss of life than in the North Western Provinces. For instance, the mortality in Orissa in 1866 is stated to have been 31·34 per cent., while that in the North Western Provinces in 1869 was about 8 per cent. additional to that occurring in an ordinary year. Forty years ago, famine in Madras decimated the population of the districts in which it occurred, but, owing to increased facilities of communication, the droughts of later years have been more easily met, and, therefore, attended with less loss of life.

82. On the other hand, as far as experience up to the present time serves as a guide, the demand and utilisation of water in Northern India is more regular in tracts where the rainfall is normally small than where it is larger, and therefore the income from irrigation is likely to be both larger and less fluctuating, so that, perhaps, the capital outlay on irrigation schemes may be sooner repaid. Against this view, however, it may be urged that, as regards the only province in Bengal in which irrigation works have as yet been constructed, there has scarcely been time to judge whether the demand for water will be fluctuating according to the seasons, or whether, when the practice of irrigation has once taken root, it will not continue to be perfectly regular. My own opinion is that, in purely rice-growing tracts, artificial irrigation must eventually be resorted to as a permanency; first, because it permits of agricultural operations being commenced much earlier, and carried on with more regularity and comparative absence of all risk; second, that river water will always be preferred to the natural rain-fall on account of its fertilising property, and its effect in lessening the exhaustion of the soil.

83. Therefore, as regards the utility of artificial irrigation, and the degree of regularity with which it will be resorted to, I think that though its development in Bengal may be slower at first, yet that eventually it is likely to be as extensively and as permanently appreciated as in the upper provinces. Viewed commercially, it is probable that the direct receipts from canals in Northern India, after the water has once become available for distribution, will be larger annually, and increase more rapidly than in Lower Bengal, but if the losses to the State from periodically recurring droughts be taken into consideration, and their prevention be set against the slower development of direct revenue, I suspect that the

Appendix, No. 6.

financial results would be in favour of the lower provinces. For instance, the expenditure in the famine of 1866 cost the Government—

	£.
For importation of food and remission of revenue	1,538,800
For public works	643,500
TOTAL	£. 2,182,300

Vide Mr. Gedde's compilation, p. 304.

In the present year the net outlay may probably reach five millions, so that in a period of eight years, drought in Bengal alone will have cost the State over seven millions sterling, or nearly at the rate of one million in a year. A very small portion of this outlay can yield any return, and hence it may be taken as a measure of what it really is worth the State's while to expend in the way of insuring those provinces against future similar visitations.

84. I think, therefore, that all the sanctioned schemes enumerated in the forecast must continue to be diligently prosecuted, and that, if it be found necessary to omit any for the present, it is only the Taptee Project in Bombay that can be discontinued, for the large Moota Scheme and the minor projects have progressed so far, that they must be completed. The amount allowed in the forecast for these schemes is—

	Sanctioned Schemes.	Contemplated.	TOTAL.
	£.	£.	£.
For 1874-75	1,373,000	202,000	
„ 1875-76	1,292,000	257,000	
„ 1876-77	1,256,000	245,000	
„ 1877-78	1,225,000	204,000	
TOTAL £.	5,146,000	908,000	
Average	1,286,500	227,000	1,513,500
Deduct contributions from Native States			106,250
TOTAL £.			1,307,250

or a little more than one-and-a-quarter millions. For the "contemplated" schemes, an average allowance of 227,000 *l.* was alloted, but amongst these no provision has been entered for the Rechna Doab project in the Punjab, or for Bundelkhund in the North Western Provinces, or for the Gunduck and other schemes in Bengal, alluded to in this note, for, at the time the forecast was prepared, there were no prognostications of the scarcity which has since occurred, and the Government of Bengal had indicated no intention or desire of submitting them for sanction within any specified time.

85. If the works recommended in this note be added to the list of "Contemplated Projects," the aggregate estimate of such works will be increased from 1,838,000 *l.* to 14,088,000 *l.* by the following schemes :—

		£.
Punjab	1. Sind-Sagur Doab	2,000,000
	2. Rechna Doab	2,000,000
	3. Derajat Canals	500,000
North West Province,	4. Bundelkhund Works	750,000
Bengal	5. The Gunduck Schemes	3,000,000
	6. The Damooda Canal ($\frac{\text{Colonel Haig's}}{\text{Estimate}}$)	1,000,000
	7. The Nuddea or Lower Ganges Canal	2,000,000
Madras	8. The Upper Tumbudra	1,500,000
		12,750,000
	Add already entered	1,838,000
	TOTAL £.	14,088,000

86. If their relative importance is to be regarded in the light of irrigation works only, I should classify the principal contemplated works thus :—

1. Bundelkhund.
2. The Gunduck.
3. The Upper Part of the Sind-Sagur Doab.
4. The Damooda.
5. The Rechna Doab.
6. The Pennair Extension (Sungum Project), Madras.
7. The Eastern Ganges Canal.
8. The Swat Project.
9. The Tanks in the Central Provinces.
10. The Dejarat Canals.
11. The Upper Tumbuddra Project in Madras.
12. The Nuddea Canals.

87. Supposing

87. Supposing that the grant for irrigation works could be increased from 1,300,000 *l.* to 2,000,000 *l.* per annum, there would remain 7,000,000 *l.* available for carrying out the above additional works, which at the rate of progress, would therefore occupy about 20 years; but as after 1877–78 there would remain only 11,580,000 *l.* to be expended on the sanctioned works, and 881,000 *l.* on the contemplated works already entered, besides 9,550,000 *l.* on the additional works just enumerated, the total to be expended after 1877–78 would be roughly 22,000,000 *l.* If the grant for 2,000,000 *l.* annually continue to be maintained, the whole would be completed in 11 years from that time, or by the year 1888–89. It may be prudent, perhaps, to allow for an increase of 10 per cent. on the above sum as a possible excess over the estimates.

88. The net income from the total capital outlay on irrigation works in operation in Northern India for the current year is 4·25 per cent., including the item of enhanced land revenue. The effect on the general prosperity of the country, such as increasing the export trade, adding to the circulation of bullion, diminishing the cost of transport, and equalising prices, cannot be set down in figures, but the results of irrigation and communications combined have this year been made evident in the large contributions of food-grains from the Upper Provinces and from Orissa. I believe, therefore, the indirect effects of completing the several projected schemes will be such on the country generally, that though there may not be a direct income in the shape of water-rates from each specific project for some years to come sufficient to cover the interest on the total capital outlay, yet that, by the security of the land revenue from those periodical fluctuations to which it has hitherto been so often subjected, not only will no additional burden in the shape of extra taxation be laid on the country by incurring that outlay, but the State will both be saved from such expenditure as the present year has imposed, and its general revenues will rise in consequence of the stimulus given by increased production, and by the increased facilities for conveying that produce to all parts of the Empire as well as to the markets of the world.

A review professedly discussing the class of works necessary for either the mitigation or prevention of famine would be incomplete if it did not deal with the kindred subject of communications as well as with that of irrigation. In every visitation of drought which has overtaken India, the efforts of the Government have been most severely taxed, not so much in the procuring of food as in its conveyance to the required destination, and the fact has been made unmistakably clear that, notwithstanding all that has been done, and all the outlay incurred, the country, as a whole, is as yet but very imperfectly supplied with cheap means of transit.

In considering, then, what yet requires to be done towards supplementing deficiencies in this respect, regard should be had at the outset to whatever natural facilities may exist ready to our hands. Particular tracts of country throughout this vast continent doubtless require exceptional measures, and local peculiarities of position require to be specially considered; but there are two fundamental principles which must always govern the question:—

1st. The necessity for connecting the different provinces one with another and with the seaboard by as many routes as possible; and,

2nd. The enormous distances which have to be traversed render it imperative that the cost of transit by those routes should be reduced to a minimum.

The best method of combining these two requisites is the problem that presents itself for solution.

It cannot be laid down that any particular system of communication must be rigidly adhered to, whether railways or water carriage; for, under certain geographical conditions, it is clear that in either case the cost both of first construction and subsequent working expenses may be so great as to render it impossible to reduce the cost of transit to the necessary low unit at which bulky goods of small value can afford to be moved, and hence it may happen that in some cases railways may prove to be the cheaper mode of conveyance, as, for instance, in hilly or undulating tracts, or where, as in Central India, the rain-fall is not only small, but spasmodic, and where there is no possibility of storage at any reasonable cost. On the other hand, the construction of a line of railway across a country subject to the overflow of such enormous bodies of water as the drainage of the Himalayas, or of rivers fed by the south-west monsoon, must necessarily be attended with such a high cost for bridging, that to meet only the interest on first cost would entail the imposition of rates of freight which would be perfectly prohibitory to such goods as form the great mass of traffic in a poor country. As a general rule, it is certain that, wherever practicable within a reasonable outlay, water carriage admits of the cheapest mode of conveyance, inasmuch as the working expenses are so exceedingly small. An inspection of the map will show its applicability to a great part of India, while the enormous traffic that takes place on the rivers of Bengal indicates its pre-eminent suitability to the circumstances of its provinces, and its thorough appreciation by the people of the country.

But cheap as transport on rivers is, the working expenses can never be reduced to the same low rate as is obtainable on canals, because on the latter—

1st. The current can be reduced to a minimum.

2nd. There is an absence of all risk from storms, and therefore no need of incurring the expense for insurance.

Appendix, No. 6.

3rd. The distances are generally shorter.

4th. Canals can be worked by night as well as by day.

5th. Smaller crews will suffice.

Besides that of cheapness, water-carriage by canals possesses the following advantages :—

1st. It admits of any class of goods being carried in the manner and at the speed which proves to be most economical and suitable for it without the slightest interference to any other class.

2nd. The landing or shipment of cargo is not confined to certain fixed stations, as is the case with railways, but boats can stop anywhere on their journey to load and unload.

3rd. The boat itself often serves as a warehouse in which the owner can keep his cargo until it is sold.

4th. The capacity for traffic is almost unlimited, even in the case of canals with locks, provided the locks are properly designed. A lock 150 feet long by 20 feet broad will pass single boats of 300 tons, or say only half that amount of tonnage if distributed amongst a number of small boats. The locks on the Midnapoor Canal are manœuvred in three minutes, but supposing twice that time were occupied, then at the rate of 10 lock-fulls of 150 tons per hour, the capacity of a single lock would be at the rate of $10 \times 150 \times 24 =$ 36,000 tons per day, or over 13 million tons per annum. If a larger traffic required to be accommodated, it could be met either by increasing the speed at which the locks were worked, or doubling their number.

5th. In the case of State canals, unless worked by the State, there is no necessity for maintaining an enormous and expensive apparatus, or establishment for working the traffic, as all that is carried on by a separate agency and by private capital, thus avoiding a large expenditure by the State both in the first cost and subsequent maintenance of rolling-stock.

Whatever then may be said for other parts of India, it can scarcely, I think, be gainsaid that for Bengal and all those portions of the Upper Provinces also where canals can be taken out of rivers with a permanent supply of water, and which can be worked into the immense existing system of navigable rivers, advantage should be taken so to design them at the outset as to combine the property of navigation with irrigation. Nowhere in the world can canals be constructed so cheaply, for the additional expense attendant on making irrigation canals navigable is comparatively small, varying from one-third in a country with a steep fall to one-tenth of the whole cost in one with a flat slope, or from 3,200 *l.* per mile, as on the irrigation reaches of the Midnapoor Canal, to between 700 *l.* and 1,200 *l.* on the Punjab and North Western Provinces canals. In every case that a canal is connected with one of the Bengal rivers, it becomes immediately accessible to the whole of the water system, which measures about 3,300 miles. The consequence is that, as soon as it becomes known that any particular article of food or of household consumption or trade is in demand, the whole existing river plant is set in motion to convey the required article from the place where it abounds to that where it is wanted. Wherever such intercommunications exist, it is quite certain that food at all events will always be conveyed to the places where it is in demand. In no other way can it be so effectively and cheaply distributed, for boats will not only stop at the exact place where there is a demand, but will serve as warehouses until their cargoes are discharged. The fact that many boat-owners are petty merchants trading on their own account is a peculiar feature in the water-borne traffic of this country, and a wider diffusion of trade is thereby ensured than where the boatmen are simply carriers of other people's goods. As an illustration of the manner in which boats ply from one distant place to another, I may mention that, when inspecting the Midnapoor Canal the other day, I found boats from such opposite places as Benares, Dacca, and Patna, all plying in that canal, though only six months had elapsed since it had been opened for through traffic.

The activity on the canals during the past year has been very considerable. On the Ganges Canal there has been a traffic of 91,000 tons carried probably between 200 to 300 miles.

On the Calcutta Canals about 1,800,000 tons have been moved.

On the Orissa Canals there have been 221,000 tons lifted on 210 miles, or at the rate of 1,000 tons per mile.

On the Godavery Canals 870,000 tons were lifted over a length of 300 miles, or at the rate of 2,900 tons per mile.

No figures for comparison with the railway for the current year are yet available, but during the first half year of 1872, 646,000 tons were lifted over a length of 1,280 miles on the East Indian Railway, giving about 500 tons per mile of railway, or if an equal amount of traffic obtained in the second half of the same year, the total lifted was about 1,000 tons per mile during the year.

It has been remarked, if such be the case with canal traffic, how is it that no corresponding receipts are forthcoming such as are obtained on the railways. The answer is very simple, that the receipts on the railways consist of the whole traffic earnings, while those from the canals are only tolls which are a very small fraction of the earnings of the carrier.

carrier. Were the Government to work their canals themselves, as they are doing the State railways, instead of only allowing others to work them, then there would be equally large receipts forthcoming; but, except in the case of passenger traffic, this is not desirable, and even for passengers it would be better to leave their conveyance to private enterprise.

The actual cost of transit on canals is very low, probably in most instances not more than $\frac{1}{8}$th of a penny per ton-mile, but the charge varies everywhere, and is regulated by the relative amount of demand and supply of carriage available.

In Orissa and the Godavery the charge fluctuates between 3 and 6 pies, equal to $\frac{3}{8}$ and $\frac{6}{8}$ of a penny per ton-mile, and on the River Ganges it is even less for long distances.

Seeing, therefore, the vital importance of multiplying inter-communications, and the absolute necessity of keeping the cost of transit as low as possible, I am sure that the Government will find that the additional cost of rendering navigable all the irrigation canals which are either in course of construction or contemplated, will be money economically expended, and nowhere more so than on the canals in North Behar, where, owing to special facilities in the gentle slope of the country, the works requisite to render them navigable can be added at so small a cost.

In a memoir on the famines which affected Bengal in the last century, Sir George Campbell has insisted strongly on the necessity for inter-communication.

In the "conclusions" which he draws from the history of the various famines he observes:—

> "3.—That, looking to the fatal effects of a failure of the rice crop in the countries of the Lower Ganges which are not supplied by artificial irrigation, and the known frightful results of famine in the Punjab in 1783, efforts should be made to supply irrigation to those countries as far as is compatible with financial necessities.
>
> "4.—And that, above all, the means of inter-communication should be placed on such a footing that they may really be efficient to supply the millions of one province from the abundance of others in case of future famine.

"45. It will doubtless always be remembered that to transport food sufficient for the supply of great masses of population we shall require means of carriage far beyond the requirements of any ordinary trade. The line of the Oudh and Rohilkhund Railway, which has now been sanctioned, communicating with the more navigable waters of the Ganges, will, in conjunction with the East Indian Railway, afford a double line of communication between the Upper and Lower Gangetic countries; and by the time that both lines are double, and that their traffic arrangements are rendered thoroughly efficient, it may be hoped that these lines, aided by water carriage, will suffice to render available the resources of one zone of the country to the necessities of another. I will only venture to express again a hope that this end may be attained before another famine overtakes us.

"46. I would further urge the extreme desirableness of pushing on the means of communication between the Punjab and the Gangetic country, the conditions of which are so dissimilar, that it has usually happened that want in one has been accompanied by great abundance in the other."

* * * * * * * * * * *

After recommending certain additions and extensions which have since been carried out on the railways, he adds—

"In case the Western Jumna Canal is remodelled (as has long been recommended), and a canal is made from the Sutlej, water communication between the Punjab and Gangetic countries might also be established."

In the projects which have lately been sanctioned, and are in progress, the above suggested connection of the Punjab with the Gangetic countries has been provided for. The Baree Doab Canal will be connected with the Sutlej and Sirhind Canal. This last is to be joined to the Western Jumna, which in its turn will be connected with the Agra Canal, and so with the Jumna itself at Agra. The navigation following that river will pick up the Western Main Canal of the Sone Series, either at Mirzapore or Chunar, and be carried on by the Eastern Main Canal to the Ganges at Monghyr. The intermediate lines will connect it with the Gunduck system and with the Oude rivers, and the Ganges itself will carry on the connection with all the rivers as far as the Brahmapootra to the east, while the Hooghly will lead it to the Damooda, the Midnapoor, and Orissa series of canals on the south and west. If the Hindun Cut and the Eastern Jumna Canal be made navigable and connected with the Ganges Canal, then the system of the North Western Provinces will be linked in with that of the Punjab, otherwise it will remain isolated, and its usefulness comparatively restricted. If this design be faithfully adhered to and properly carried out, then every province will in its turn be able to contribute to the necessities of any other, and all their varied products will be interchangeable at the lowest possible rates. Further, by the construction of the Lower Sutlej series of canals from the weir at Hurreekee Pattan, the line of communication will be continued to the Indus, and a traffic will then be generated, the limits to which are beyond the possibilities of calculation, but an idea of which may be formed from that which is now taking place on the great water-systems of America.

F. H. Rundall,
Inspector General of Irrigation.

31 March 1874.

Appendix, No. 6.

(Nos. 707—22 C. W.—I.)

Government of India.—Public Works Department.—Civil Works.—Irrigation.

Fort William, 27 November 1874.—Review of the Wants and Prospects of India in regard to Irrigation Works.

Read again—

Public Works Department Resolution No. 377 A—G, dated 18 July 1873.

Read—

A Memorandum of the Progress of Irrigation Schemes in relation to Famine Aspects by Colonel F. H. Rundall, R.E., Inspector General of Irrigation Works, dated the 13th April 1874.

RESOLUTION.—When the famine in Behar was anticipated in the autumn of 1873, Colonel Rundall, who was just about to quit office on the expiration of his period of re-appointment as Inspector General of Irrigation, was desired to review the progress and prospects of irrigation in view to the prevention or mitigation of future famines. He has sent in a memorandum just read, which contains very interesting and valuable information.

2. Colonel Rundall's paper is rather a review of the works of irrigation that appear to be desirable in different parts of India, than a statement of the position of any particular works which, in his opinion, are urgently and immediately called for in view to the prevention of famine (paras. 80 and 84).

3. He selects 12 projects, which he arranges in the order of the degree of urgency which he assigns to them. These projects he calculates will add 12,750,000 *l.* to the outlay of 20,325,000 *l.* which the Government of India contemplated in preparing the forecast of 1873, and he calculates that, if the annual grant can be raised from its present amount to 2,000,000 *l.* per annum, the whole may be finished in 14 years from the present time.

4. The projects set down by Colonel Rundall, with the sums he has placed against them, as indicating, as far as present information goes, that they are likely to cost, are as follows, the works being placed in order of urgency according to Colonel Rundall's views :—

		£.
1. The Bundelkhund Project		750,000
2. The Gunduck Project		3,000,000
3. The Upper Sind-Saugor Doab		2,000,000
4. The Damooda		1,000,000
5. The Rechna Doab		2,000,000
6. The Sungum Project	Not separately given.	1,838,000
7. The Eastern Ganges Canal		
8. The Swat Project		
9. The Tanks Project in the Central Provinces		
10. The Derajat Canals		500,000
11. The Upper Toombuddra Project		1,500,000
12. The Nuddee Canal		200,000
	£.	14,588,000

Of these, the projects linked together as likely to cost 1,838,000 *l.*, were included in the forecast of 1873, and the aggregate cost of the rest is 12,750,000 *l.*

5. It is first to be mentioned, that in all these cases Colonel Rundall has set down what is expected to be the entire cost of the complete projects, and has thus given a view of the extreme outlay (subject, however, to possible increase of estimates—para. 87), the Government would have to adopt in carrying out to the full the entire series of projects sketched out. But even if they were all undertaken, in many cases it would not be necessary or desirable to carry them out to their full extent.

6. Again, it is to be remarked that Colonel Rundall does not desire to disturb existing arrangements. The schemes proposed by him are recommended as additions to the series of operations now in progress, or contemplated. It is now to be conidered whether any of these proposed additions are of such urgency as to require the Government to enlarge financially its scale of operations. The several projects will now be taken in order and examined in this view :—

(1.) *The*

(1.) *The Bundelkhund Project.*—There is no doubt that the country for which these works are designed, has suffered severely and frequently from drought. The projects have been many years in contemplation, and the only doubt now remaining as to the expediency of undertaking them, is the sufficiency of the water supply in time of dearth. This subject is undergoing searching inquiry, and the undertaking of the works must depend upon the result. In any case, the amount required is such as could be provided without seriously disturbing the scale of expenditure.

(2.) *The Gunduck Project.*—Colonel Rundall takes the estimate of 1869, and both the lower project of Major Jeffreys, and the upper one of Mr. Stoney. It is doubted if the estimates would suffice now for the works as designed, and the prospects of irrigation are not so encouraging as to induce the Government to undertake more than a moderate scheme. The subject has been fully discussed, and the decision arrived at is contained in a Resolution in this Department, No. 618—24, dated 8th October last. A series of small works may be sanctioned hereafter without disturbing the existing scale of outlay.

(3.) *The Upper Part of the Sind-Sagur Doab.*—The estimates of these works are not yet before the Government of India. It is understood that the Punjab Government is not likely to recommend any early outlay exceeding one million sterling. But the project is only indirectly connected with the prevention of famine. Its aim is to collect in a well-watered tract, to be created by the canal, the sparse populations of the neighbouring almost desert tracts whose food supplies are precarious. It is evidently not a work to undertake as immediately required for the prevention of famine.

(4.) *The Damooda Canal Project.*—This work is intended to protect a tract of country between the Damooda and the Hooghly, which has suffered recently from want of water. The Government of India has already sanctioned a small experimental work, which may, if found to answer, be hereafter developed. Meanwhile, this project may stand over. The country is nowhere far from the East Indian Railway, and there can be little or no danger of a deficiency of supplies in the event of a local failure.

(5.) *The Rechna Doab.*—The case of this country is nearly the same as that of No. 3, the Sind-Sagur Doab.

(6.) *The Sungum Project.*—This is a project for the extension of irrigation already existing. The country may be considered to be already protected from severe famine, and is, moreover, within reach of the importation of grain by sea. The prospects of this project are now under discussion with the Madras Government. It does not require to be undertaken as specially urgent on account of danger of famine.

(7.) *The Eastern Ganges Canal.*—Parts of the country for which this project is designed have suffered severely from famine. Other parts have the spring level so near the surface, that it is doubtful how far irrigation is really necessary. Again, there is the doubt whether it will not be better to utilize the entire dry season supply of water in the Ganges on the right bank in the Upper and Lower Ganges Canals, where there is no doubt of the want of irrigation. These doubtful points are under discussion with the Government of the North Western Provinces, and, pending their settlement, this project cannot be undertaken. The country is at all events near the Oudh and Rohilkhund Railway at Moradabad, and can easily obtain supplies of grain in cases of severe drought. In case of its being decided not to proceed with the Eastern Ganges Canal, the smaller project from the Ramgunga will require to be considered.

(8.) *The Swat Project.*—This small project was designed chiefly to assist in inducing settled habits on a turbulent population, and though most desirable in itself, cannot be considered as specially required in view to the prevention of famine. It is, moreover, too small to affect financial arrangements.

(9.) *The Tanks in the Central Provinces.*—Of these, two designs have been worked out in view to making an experiment on the value of irrigation in the Central Provinces. It still remains to consider how far it is expedient to proceed to actual construction. The work cannot be considered as urgently required.

(10.) *The Derajat Canals.*—The Local Government has a project ready, which is estimated to cost 330,000 *l.*, the outlay on which will be spread over several years. It has not yet been submitted. The works will, no doubt, tend to secure the crops, but cannot be considered as urgently required for the prevention of famine. The amount of the expenditure at present contemplated is not such as to disturb existing arrangements.

(11.) *The Upper Tumbuddra Project.*—It is doubtful if this project can be carried out without interfering with the Madras Irrigation Company's Works, and whether it can be carried out in any case within such limits of expense as to make it practicable. It cannot, therefore, be undertaken as an urgent work.

(12.) *The Nuddea Project.*—This is a project designed to take its source from the Ganges at Sahibgunj to irrigate the country south of the Ganges in the Moorshedabad and Nuddea Districts. There is no record of severe famine in these districts since

Appendix, No. 6.

1770, but relief works were required in 1865-66. It is doubtful if the work should be constructed at all, and it cannot be considered urgent. The country is within reach of railways and of river navigation.

7. From this review it appears that the Bundelkhund Projects can, if proved to be satisfactory, be provided for within the existing scale of operations. The same may be said of the works projected for Tirhoot under decision contained in the Government Resolution No. 618 of the 8th of October. Generally, therefore, it may be said that there is no project at present so urgently required in view to the prevention of famine as to render it necessary to extend financially the scale of operations in irrigation works.

8. Such projects as are now in hand may be carried forward on the scale of expenditure now in force, or as it may be modified from time to time by financial considerations; and new projects may be added as those in hand are finished off, after such new projects have been carefully examined and have been shown to be such as the Government will be financially justified in undertaking.

9. There are some other points in Colonel Rundall's memorandum beyond the immediate undertaking of projects for irrigation which may be noticed here. The first of these refers to certain proposals for surveys. In para. 19 the Goruckpoor District is referred to. This and the adjacent district of Oudh have been considered in the recent Resolutions of the Government of India on Irrigation and Railways in North Behar. In paras. 32 and 34, surveys in connection with irrigation from the Koosi, Mahanuddi, and Teesta are suggested. The possibility of using the waters of the Koosi on the Tirhoot side is one of the subjects of investigation provided for in the Resolution of the 8th of October last. In the other cases it appears to the Government of India that the works are not urgently required. The Northern Bengal Railway will afford protection from severe distress. But surveys in view to small projects, such as have been contemplated for Tirhoot, may be set in hand if considered desirable by the Local Government when the other more pressing work before the Irrigation Department of Bengal permits. Meanwhile, the local district authorities should consider the question of introducing irrigation in Northern Bengal. The same course may be pursued regarding the small tank projects suggested in paras. 36 and 41 for the Sonthal Country and Chota Nagpore.

10. In paras. 43 to 50, Colonel Rundall strongly urges the necessity for completing the Midnapore and Orissa series of works. Provision has been made in the Budget Estimate and the Forecast for a moderate progress to this end; and the Lieutenant Governor of Bengal has been consulted as to the scale on which operations should be carried on. Sir Richard Temple has arranged to visit Orissa, and will communicate his views to the Government of India.

11. The attention of the Government of the North Western Provinces will be drawn to the remarks on the Ganges Canal Navigation in para. 15.

12. The question of the extension of the East Coast Canal, which is a local work, is believed to be under the consideration of the Madras Government. There is no objection to a loan being granted for that object if there are funds available, and the requirements of the Local Loans Act are complied with. The navigation of the Upper Godavery, referred to in para. 54, is under discussion with the Madras Government.

13. Colonel Rundall, in paragraphs 29 and 30, refers to the advantages of making the canals in North Behar navigable; and the subject of navigation in conjunction with irrigation canals is strongly advocated in the concluding paragraphs of the memorandum. The Government of India is quite sensible of the advantages in many cases of combining navigation with irrigation, and the consideration of the subject should never be omitted in preparing and submitting irrigation projects. But economy in the construction of irrigation canals is an object of such paramount importance, that all other considerations must give way to it, and in this view, navigation can only be afforded when there is an assured prospect of a return for the outlay, or when the extra expense of supplying facilities for navigation is comparatively small.

14. The local governments and administrations will be invited to report their views on the matters noted in Colonel Rundall's memorandum.

ORDER.

Ordered, that the foregoing, with the papers above read, be communicated to the several local governments and administrations in the Public Works Department, Irrigation Branch, for information and guidance.

Ordered also, that copies be forwarded to the Secretary of State, the Financial Department, and the Department of Revenue, Agriculture, and Commerce, for information; and further, that the papers, with the resolution, be published in the "Gazette of India."

Colonel, R.A.,
Secretary to the Government of India.

Appendix, No. 7.

PAPER put in by Colonel *Crofton*, R.E.

THE SIRHIND CANAL.

Appendix, No. 7.

THIS is a perennial canal, taken off from the Sutlej on its left bank, close to the town of Roopur, in the Umballa district of the Punjab, at the point where the river debouches into the plains. It will irrigate portions of the British districts of Loodiana and Ferospoor, and of the Native States of Puttiala, Sheend, and Nabha, to the west of the River Cuggur.

The possibility of drawing water from the Sutlej for the irrigation of this tract of country was first suggested and proved in the year 1840, when surveys were carried out under the orders of Government by Captain (now General Sir W. E.) Baker, to ascertain the practicability of supplying water to the British districts of Lissa and Hissar, situated to the southward of the Native States mentioned above. The project then sketched out, however, fell into abeyance owing to the want of funds at that time to carry it out, and to the circumstance of a large extent of Native territory intervening between the source of supply and the lands it was proposed to irrigate.

The subject was revived in 1860, when the then Maharajah of Puttiala requested the Governor General (Lord Canning) to have the whole question thoroughly re-investigated by British officers, with the view of ascertaining the practicability and probable cost of irrigating his own territory from the Sutlej, offering at the same time to defray all the expenses of the investigation and surveys, &c., whether the scheme proved to be feasible or not. This offer was accepted, and the first detailed project and estimate was completed in 1862, which contemplated the irrigation of the Puttiala territory to as great an extent as was practicable, with branches to the westward for the Loodiana and Ferospoor districts. Owing to the death of the Maharajah (Nurender Singh) in November 1862, the project was not then carried out. It remained in abeyance till 1868, when it was again taken up and re-estimated under orders from Government, an agreement being drafted at the same time with the three principal Native States whose lands would receive irrigation from the canals, defining their shares of the water and expenses as joint proprietors with the British Government.

The project then drawn up, and now in progress, comprised a main channel from the Sutlej near Roopur, supplied by a masonry dam across the river; the length of the main channel being 41 miles, at the termination of which the division of the water is effected; a channel to the eastward supplying the branches which mainly irrigate the lands of the Native States, termed the Puttiala branches, another to the west for the British branches.

The total length of main and branch channels is 530 miles, excluding a navigable junction 55 miles long, with the Western Jumna Canal, which, by the orders of Government, is defunct for the present; and of this total length 209 miles are navigable. The ordinary supply of water will be 3,000 cubit feet per second, rising to 4,500 cubic feet in the monsoon, which may occasionally be increased to 6,000 cubit feet per second.

The area of country affected by the canals is 8,476 square miles, of which 5,528 square miles appertain to the British branches, 2,948 square miles to the Puttiala branches. Of this it is estimated that 783,000 acres, or about one-seventh, will be irrigable, 507,300 from the British branches, 275,700 acres from the Puttiala branches. Portions of British territory will be irrigated by the Puttiala branches, and similarly, portions of Native States will receive irrigation from the British branches; the proportion of the total irrigable area being estimated at 376,604 acres in British territory, 506,396 acres in the Native States.

The total cost of the works, excluding the navigable junction to the Western Jumna Canal, is estimated at 3,087,000 *l.*, of which 1,914,240 *l.* is the British share; 1,172,760 *l.* is payable by the Native States.

The share of the latter amount falling on each State is as follows:

	£.
Puttiala - - - - - - - -	1,010,451
Sheend - - - - - - - -	53,453
Nabha - - - - - - - -	108,856

The cost of the navigable junction to the Western Jumna Canal, if carried out hereafter, is estimated at 215,445 *l.*, in addition to the above total.

Appendix, No. 7.

This channel forms a link in a projected water communication from North India to the seaboard on the Bay of Bengal, the upper portion of which, from the Sutlej at Ferospoor, will be supplied by the channels of the Sirhind Canal now under construction, and which the new channels of the Western Jumna Canal will carry on to the Jumna river, south of the city of Delhi.

The estimated profit on the British share of the expenditure is 8¾ per cent., or 8 per cent. if interest during construction be added to that expenditure.

The main provisions of the agreement with the Native States, which was signed in 1873, are as follow:—

1. The project to be designed, and the works carried out, exclusively by the British Government, under its own officers.

2. The works to be projected on the general basis of distributing the water in the most economical manner to the districts east of the Sutlej commanded by the canals.

3. The share of the water supply to be allotted to each branch, in proportion to the area commanded by each.

4. The entire cost of the *main* canal, and of the preparation of the project, including that of the survey and project of 1862, to be defrayed by the British Government and the Native States, in proportion to the water supply allotted to each; but the whole cost of the British branches to be borne by the British Government, that of the Puttiala branches by the Native States. Each State to defray the entire expenditure on its own distributary channels.

5. The Native States to supply annually a share of the estimated annual outlay during construction, in the same proportion as described above for the entire outlay.

6. The Native States to pay a seignorage to the British Government, in consideration of the water supplied, at the rate of four annas (sixpence) per acre per annum, which will not be demanded until the British branches yield a profit; in any case, not till the eleventh year after admission of water into the canals.

7. Subsequent to the admission of water, the management of the main channels of the Puttiala branches to rest with the British Government, but each State to have entire charge of its own distributaries, and to defray all expenses of maintenance both of branches and distributaries, as well as a share of the maintenance of the *main* canal, in proportion to the share of the water supply allotted to each.

8. No transit duties to be levied on the canals. The income from navigation tolls to be shared as follows:—

1st. The Native States to receive a share of the tolls on the *main* canal, in the same proportion as described above for expenditure.

2nd. In through traffic on the branches the tolls to be shared by the British Government and the Native States, in proportion to the distance traversed on the canals belonging to each.

3rd. The Native States to receive all tolls levied on the Puttiala branches exclusively.

9. British villages, and those of other Native States along the Puttiala branches, to share the water, if required, equally with the States concerned.

10. Details of superintendence, and other matters connected with the management not dealt with in the agreement, to be settled by the Punjab Government with the States concerned, subject to the confirmation of the Supreme Government.

The works were commenced in 1869, and water will probably be admitted in 1879–80.

15 May 1878. *J. Crofton.*

Appendix, No. 8.

PAPER put in by Sir *George Campbell*, M.P., 16 May 1878.

THE FAMINES WHICH AFFECTED BENGAL IN THE LAST CENTURY. Appendix, No. 8.

THE only occasion on which Bengal Proper has suffered very wide-spreading and exreme calamity from drought since the establishment of British rule, is the Great Famine of 1770; and therefore, as regards the risk of drought, my inquiries have been for the most part concentrated on the event of that year. I may add that all that I have been able to discover fortifies the view originally taken by the Commission, viz., that injuries due to inundation alone have always been, and must always be, in some sense, partial, that is, confined to particular districts or parts of districts; that in India all very wide-spreading famines are mainly caused by drought.

A minute search of the records of the India Office has not led to the discovery of any special reports, in our modern sense, recounting the whole history of the great Bengal Famine. It has only been possible by completely sifting the general records to pick out here and there the passages which bear on the calamity. The result is not to give us its history in any great detail, but I trust that enough has been gathered to put us in possession of its general character.

2. Far as Bengal was then removed from its present state of wealth and prosperity, it does not appear that the great misfortune of the last century was occasioned or very materially aggravated by other than natural causes. For some years under the protection of British rule the province had enjoyed peace and security. "If," says the Government of Bengal, writing to the Court of Directors on the 9th of May 1770, "the internal prosperity of these provinces corresponded with our external security, we should be happy; but it is far otherwise; not a drop of rain has fallen in most of the districts for six months. The famine which has ensued, the mortality, the beggary, exceed all description. Above one-third of the inhabitants have perished in the once plentiful Province of Purneah; and in other parts the misery is equal."

This particular district of Purneah is in another place said to have suffered from the administration of bad amils, but Bengal generally seems to have been comparatively prosperous up to 1769, and to have paid a large and increasing revenue.

3. It was remarked in a former part of our Report, that the tables of the Fiscal of Chinsurah seemed to show that the average price of rice before the famine of 1770, was not very greatly different from that prevailing in Bengal in comparatively recent times. This is probably true as respects the marts of European commerce on the Hooghly, but the scattered notices regarding the usual price of grain in some of the districts of the interior, lead me to think that the observation must be modified as respects such parts of the country; that in fact, in remote districts, rice was much cheaper in the last century than in recent times, and that consequently the same figures would then represent much greater comparative want than in these times. The truth is that, with modern means of communication, prices are much more equalised.

4. Orissa was not then a British province, and my present inquiry furnishes me with no information regarding its condition in 1770. Nor can I here take account of the possibility that the great want at Madras which seems on more than one occasion to have immediately preceded want in Bengal, may point to a wider range of the same disturbance of the climatic system of India. As respects the great mass of the countries to the south and west, I have no information of their condition at this time. But confining myself to the countries belonging to, or in communication with, the Bengal Presidency, the area of the famine of 1770 can be marked out with some precision. Behar suffered in an extreme degree, but it is expressly stated by the officers there that their neighbours did not suffer in the same way, or at least to the same degree. Supplies wers drawn from Oude, and attempts were also made to procure assistance from the Benares and Allahabad provinces, which were comparatively better off. It may, therefore, be assumed that this famine did not in its severest form extend far west of Behar.

Northern Bengal especially suffered. Even from the usually moist north-eastern districts of Rungpore and Dinagepore, the accounts are peculiarly distressing. Purneah has been already mentioned. And Rajeshye, Moorshedabad, Rajmahal, Jessore, Hooghly, Bheer-

App endix, No 8.

bhoom, Burdwan, and Calcutta, were all sooner or later involved in the calamity. Dacca is at first mentioned as if it had for the most part escaped, but eventually we have the following specific statement in a letter from Mr. Middleton, who was at Dacca on a tour of inquiry after the famine: "On my arrival here I had the mortification to find this district had not been exempt from a participation in the devastation and distress which the late famine occasioned throughout the province, and although the unhappy effects of the calamity were experienced in a more moderate degree here than in many other parts, yet its being immediately succeeded by a dreadful inundation which destroyed a considerable part of the crops of last year, was a circumstance altogether unfavourable;" and he goes on to speak of the "impoverished and depopulated state of the country."

Even as respects the Rajah of Tipperah's Zeminderee, Mr. Wilkins, supervisor of Tipperah and Islamabad, speaks of "the distress his country was involved in by the famine that visited it in common with the other parts of Bengal." The only part of Bengal which seems to have escaped, and from which some very scanty supplies were drawn to the western districts was the low south-eastern corner, the districts of Backergunge and Chittagong.

With the exception then of this comparatively small south-eastern tract the famine involved in greater or less degree the whole of Bengal and Behar.

5. In tracing the course of the famine, I find that the first alarm came from Behar, where two bad years were experienced in succession. So early as the 1st February 1769, the Resident in Behar reported very great distress among the ryots, in consequence of long continued drought. It is to be gathered that there had been floods in August 1768, and "from the middle of August (of that year) there was no rain till the beginning of January; and then it lasted only a few hours, and came too late for the general benefit." The Resident urged the "absolute and immediate necessity to consider the poor and suffering ryots distressed by what no human foresight could foresee or prevent." That the amils might not exaggerate, he sent his assistants to inspect and report, and found "that the damage is general, but more felt in some places than in others; those parts that lay near the hills have suffered most. In the low countries they have been assisted by their reservoirs of water." He proposed large abatements of the revenue, which were sanctioned.

6. The following season commenced very badly. On the 28th July 1769, the Resident in Behar reported that up to that time "we have only had in some parts a few showers, and those so very trifling that but little benefit has been received from them. The grain sown some time ago is entirely spoilt. The province he said was much distressed and the people with difficulty prevented flying the country. On the 1st August he repeated the same tale, adding ".the effects of it begin now to be severely felt. Neither Shetab Roy, nor I, can stir out but we are stopped by multitudes of the poor pressing to make known their distress. Grain has within these few days risen to a prodigious price, and continues to increase, as there is not only the greatest probability of losing the entire harvest, but a general famine to be dreaded." The grain duties were taken off, exportation prohibited, and the Golahs opened, but all, the Resident feared, would be ineffectual without rain. A fews days later he reports more hopefully. Some very plentiful showers had fallen, and from the weather a further supply was hoped for, all which had changed the face of affairs. These hopes, however, proved fallacious, little more rain fell, and in the subsequent months the famine was fully established. In the Bengal consultations of date 23rd October 1769, we find Mr. Rumbold, the late Resident in Behar, stating that the country is "distressed beyond conception from the prevailing drought, which (not having had one day's continued rain through the season) fills one with the dreadful apprehension of an approaching famine. Rice sold at 10 seers for the rupee when I left Patna, and the distress of the poor appeared daily." The price quoted was, no doubt, an extreme famine price in Behar in those days. The Council on this date resolved to import rice for the relief of the Behar stations from the Eastern districts.

7. I have not found the contemporary reports of the season 1768-69 in Bengal, but that in North Bengal that season was bad, is shown by the subsequent statements of the Resident at the Durbar (at Moorshedabad), who on 17th August 1769 reported the "alarming want of rain which has prevailed throughout all the upper parts of Bengal both the last and this season and particularly the latter, to a degree which has not been known in the memory of the oldest man." On 26th August he adds "there is great reason to apprehend that in all the districts to the northward of Nuddea the crops of rice will be very short indeed. Since the season for rain began they have hardly had any, and if God does not soon bless this country with plentiful showers, the most fatal consequences will ensue,—not only a reduction in the revenues, but a scene of misery and distress that is a constant attendant on famine. God, of his infinite goodness, avert the dreadful calamity."

I do not find traces of any great failure in the Southern districts of Bengal in 1768–69; but either from failure in the early rains of the season 1769–70, or from the demand to supply the Northern districts, rice had become very scarce in Calcutta so early as the beginning of August 1769. Madras having suffered from drought and the ravages of the enemy, the Government had sought supplies from Calcutta. On 1st August 1769, the Bengal Council resolved to dispatch two ship-loads of rise to their aid. "The scarcity of this article, however, prevailed so much at our Settlement that the Buxey represented to us it would be impossible to provide two cargoes.

8. From September onwards, the march of the calamity seems to have been without abatement, and we have more and more frequent mention of the state of "the country distressed

distressed beyond conception from the late prevailing drought in every part of the province." In October no rain fell. On the 20th November 1769, the Collector General at the Presidency made strong representations respecting "the general calamity in these provinces from the uncommon drought which has prevailed;" and with regard to the districts in his own especial charge he urged the necessity of measures for the present relief of the ryots, not only in Burdwan, but in the Calcutta lands. He saw an "alarming prospect of the province becoming desolate." He had at first discountenanced complaints, but "being thoroughly convinced by the daily flight of numbers of ryots that the calamity is real and not imaginary, motives of humanity and duty now equally urge me to lay before you the distresses of the country. In the southern quarter or lowlands of the province, they have fortunately been blessed with some rain; but to the northward the drought has been so severe as to occasion a total loss of the rice crop in some places, and the greater part of it in others." The Board were "but too much convinced of the melancholy truth of the representations," and sanctioned various remissions.

9. On the 23rd November 1769, the Bengal Government formally reported to the Court of Directors the existing distress. They say,—

"It is with great concern, gentlemen, that we are to inform you that we have a most melancholy prospect before our eyes of universal distress, for want of grain, owing to an uncommon drought that has prevailed over every part of the country, insomuch that the oldest inhabitants never remember to have known anything like it, and as to threaten a famine."

"As there is the greatest probability that this distress will increase, and a certainty that it cannot be alleviated for six months to come, we have ordered a stock of grain sufficient to serve our army during that period, to be laid up in proper store-houses; and we have taken and shall pursue every means in our power to relieve the miserable situation the poor inhabitants must be involved in from this dreadful calamity; but we cannot flatter ourselves that all our endeavours will prevent very fatal results being felt, or that human means can check its baneful influence."

"The consequence of so general a calamity cannot be confined to individuals, and though they may most severely feel them, the public must suffer likewise; and we have too much reason to apprehend it will occasion a very considerable diminution in your revenue, to what amount, we cannot at present form a judgment; but we deem it our indispensable duty to give thus early information, in hopes by being prepared for such an accident you may be the better able to guard against its effects; and we would take the liberty to suggest whether a considerable diminution in your revenue from so unforseen and unavoidable a cause may not be a just plea for a proportional abatement to be made from the demands of Government, as well as that of your being dispossessed of any part of your territorial acquisitions and revenues by any foreign power."

10. The first requisitions for grain to meet the wants of Behar and other places, were sent to the British authorities at Dacca, who being apparently unable to procure a supply on the spot, deputed a gentleman to Backergunge to purchase grain. The Government informed the Resident in Behar of their willingness to "grant unto the ryots the utmost assistance in our power." Behar, in fact, for some time continued to be the province which presented the greatest scene of distress:—"The plough stands still, and numbers of the ryots desert their homes," as the native authority put it. On the 26th December 1769, the new Resident at Patna writes:—"It is not only the apprehension of distant evils," but the extremity of immediate distress that we are required to oppose a remedy to, and each day lost in deliberation adds to the calamity. It will be some encouragement to the ryots at least to be assured that the thoughts of Government are employed for their alleviation. If we may judge of the interior of the country from the city of Patna, it must be in most deplorable circumstances indeed. From 50 to 60 people have died of absolute hunger in the streets every day for these 10 days past. The Rajah informs me that there are about 8,000 beggars in the place, and if he was to attempt to assist them in a public manner the number would still increase from every village about Patna. For the relief of those near my own habitation, I have taken the liberty to serve out 50 rupees worth of rice daily at the Company's charge. The Rajah proposed to allot about two lakhs of rupees for the assistance of the poor, but I told him I could by no means give sanction to such a measure without your permission." In reply, the Government did not deal directly with this question of the two lakhs. They sanctioned the 50 rupees per diem, which "being an expense which ought to weigh little against the obligations whereby we are bound to protect and assist the people of those provinces, meets with our entire approbation; and should the distress increase we will allow of your enlarging that allowance in proportion, but with all possible economy." Remissions of revenue at the discretion of the Resident were also sanctioned. The view that the calamity was due solely to natural causes under antecedent circumstances of comparative prosperty, is confirmed by the observation of the Government in these orders, "We are well aware that a scarcity of grain, not of species, is the evil generally felt in Behar."

11. Meantime in Northern Bengal, and other districts also, the evil was becoming very great, and especially in Purneah, on the confines of Bengal and Behar. On 25th January the Government reported home that their apprehensions were confirmed, and the calamity severely felt in all the provinces. They announced remissions of revenue to the farmers, "taking care that they also extend it to the ryots."

Appendix, No. 8,

On the 4th February they again report,—

"The droughts which have so long prevailed, we are concerned to acquaint you still continue. No part of either province has been exempt from the calamity, but Behar has more particularly and severely felt its influence. Whatever the experience of Mr. Rumbold and Shetab Roy, the advice of Mahomed Reza Cawn and our own judgment could suggest, has been maturely weighed, and every precaution taken for the support of the collections and alleviation of the evil. Notwithstanding these our endeavours, the daily accounts from Behar represent such scenes of misery and wretchedness, such general poverty and despondency, that we cannot expect to see a revenue equal to former years. Abatements must in some measure keep pace with the necessities of the country; it shall be our care that they be not wantonly allowed or ineffectually applied."

"In Bengal we have not found yet any failure in the revenue or stated payments; but we must not flatter ourselves in a country where the labourer depends merely on the coming in of the harvest,—not on any established or accumulated property,—that he can always pay the full demands of Government, neither can we with any regard to justice or consequences, insist on it."

"We shall think ourselves happy if by relaxing the rigour of the demands for a time, we give encouragement and leave room for the industry of the poor, to exert itself in retrieving the calamities of one year during the course of more successful seasons."

12. In the beginning of February the Resident and native authorities at Moorshedabad had arranged a plan to have rice distributed daily in the city at six places at half a seer to each person. The Government approve, he "may be assured of our concurrence in every measure for the relief of the poor," and they "earnestly recommend his taking every step towards this purpose." Exportation was prohibited from certain districts, and fresh orders issued for the purchase of rice in the south-east and north-west; but a general restriction on grain was thought premature.

13. Early in February 1770 a little partial rain seems to have fallen in some districts, but it was quite insufficient to do any material good, and from that time to the end of May the drought was universal. Not a drop of rain fell, and the country became daily more and more parched and distressed.

14. On the 16th March the Resident in Behar submitted a report with enclosures giving the result of inquiries in various districts. "They exhibited," he says, "a most affecting scene of poverty and distress, much beyond what I myself should have credited from report." "The depopulation in the interior parts of the country is now more rapid than can well be imagined by any person who has not been witness to it; and such is the disposition of the people that they seem rather inclined to submit to death than extricate themselves from the misery of hunger by industry and labour."

As respects his own head-quarters he says:—"The miseries of the poor of this place increase in such a manner that no less than 150 have died in a day in Patna. In consequence of this and the latitude you give me I disburse on the company's account daily 330 Somnath rupees. The officers at Dinapore by a private subscription feed a large number, and the French and Dutch give as largely as can be expected from their small factories."

15. On 30th March the Resident at Moorshedabad continues the history as respects Bengal,—"I think it my indispensable duty to give you an insight into its present miserable situation which has been occasioned by the most extraordinary drought (ever known) for these last 10 years." "Extracts of letters which accompany this will paint the real misery of the inhabitants in such strong colours that little remains for me to add, only to assure you that from the strictest inquiry and from the most undeniable evidence, there does not remain a doubt that these representations present a true picture of the distress and misery existing in these provinces." "The districts that have more particularly suffered by the unfavourableness of the season are Purneah, Rajmehal, Bheerbhoom, and a part of Rajeshye." The measures of relief which he adopted were advances to ryots, remissions of revenue, and distributions of food. A little later he says that he had intended to proceed on tour, but was deterred for the present being "persuaded that though my humanity may be shocked at the numberless scenes of distress that would present themselves to my view, little would remain in my power to contribute to their comfort, while God pleases to hold from them the blessing of rain, and the country remains parched and unfit for cultivation." "The distress of the inhabitants does does not only proceed from scarcity of provisions, but in many parts they are without water to drink." His assistants were out in their districts and all tell the same harassing story. Mr. Stuart assures him that "the miserable condition of Bheerbhoom and the inhabitants almost exceed belief." The native amil says that "Purneah, which was once a plentiful country, retains now nothing but the name of its former abundance." "Multitudes already have and continue to perish of hunger." "Never was there in any place before so melancholy a scene. Often when I contemplate the prevailing misery my compassion and pity are excited, yet overruled by my regard for the welfare of the Government; appearing blind to their distress and deaf to their lamentations I neglect not the interests of the Sircar." The European Supervisor, Mr. Daniel, adds that the number of dead bodies lying about has infected the air in a fearful degree. In the higher pergunnahs "I do not believe I should in anywise exaggerate in saying that half the ryots were dead, for if I were to speak from report or what I have seen, I should judge the number to be rather more than less."

From

From Jessore the history of the calamity is thus told: "The little water that, before the month of Sawun 1769, was collected was soon exhausted by the ryots watering their rice grounds, and the ground then becoming quite parched, the ryots held open the eye of hope towards the blessing of the Almighty during the whole of the month of Bhadon, at the expiration of which the land was become as hard and dry as a piece of rock." Things went from bad to worse till "mankind are employed in bringing the leaves of the trees from the jungle for food, and they offer for sale their sons and daughters."

The whole district of Rungpore suffered very much with the exception of one pergunnah; and from other districts the same story is repeated.

16. At this time efforts were made to obtain grain from Oude, but great difficulties were experienced, the Nawab-Nazim's people gave very ineffectual aid; the price rose, and there was the usual unwillingness to permit the exportation of food in times of alarm: 100 boat-loads were promised at Fyzabad on Government account, but on 10th April Captain Gabriel Harper writes from thence that as yet he has only been able to dispatch 15, but he is in daily expectation of the arrival of more from Byramghat. The Governor urgently addressed the Nawab Nazim who issued orders for the collection of grain in his western districts, and sent detachments of troops to enforce his orders, but in this way it came in very slowly.

17. In the end of April, the Resident in Behar reports that the hopes of getting something from the spring harvest (much of which is there raised by irrigation from wells) have been greatly disappointed, that the price of grain continues to rise and the famine continues to increase. Owing to the difficulty of feeding the troops, he urges their removal to the Benares and Oude territories, a measure which, for political reasons, the Government were unable to sanction.

On 2nd May, Captain Harper reports from Fyzabad that prices there have greatly risen the last few days, and the difficulty of procuring grain increases; the Nawab does all he can, and boats are expected, but some of those already dispatched have been lost.

The officer commanding at Allahabad, Colonel Primrose Gailliez, has been directed to send down all he can, but he is unable to comply; he cannot get more than enough for his own garrison. "Though the inhabitants are not in such distress here as in the provinces, yet grains of all sorts are immoderately dear, and his Majesty has absolutely refused me liberty to buy up any to send down the country lest the inhabitants of this place should suffer in consequence of it. It is true that I have been able to purchase some grain at Corah, but there is such difficulty, perpetual interruptions, and disputes in getting it down, that I fear little can be obtained from thence."

Probably, however, private enterprise did more than the Government, and Behar was certainly materially relieved by importation, for the Resident writing on 15th May says, "happily for us, our neighbours did not share equally in this misfortune, or we should have been deprived of those supplies to which so large a part of the inhabitants of this province are indebted for their present existence." The mortality he calculates to have already reached 200,000, to which he adds the loss of cattle and the inability of those men who remain to work from the weakness of their bodies.

18. Hitherto, the greatest suffering had occurred in Behar and the Bengal districts north of the Ganges; but these seem to have reached their worst about this time, and probably (although the price of grain is not specifically stated) never experienced the pitch of scarcity and dearness which occurred somewhat later south of the Ganges; for in the first half of July, when things were at their worst in these latter districts, the Resident at Moorshedabad distinctly states that matters have improved in the districts to the north. Behar had no doubt been somewhat relieved by importations from the west, and the hopes of the people raised by the plentiful rain which fell in June 1770, while the north-eastern districts of Bengal being in more easy communication with those of the south-east, probably benefited more by importations from thence than did those to the south-west. In the northern and north-western districts, I should judge the famine to have been more analagous to those which have occurred in the North Western Provinces, commencing earlier, and terminating sooner than in the more southern districts of Bengal.

19. In these latter, the course of the famine much more closely followed that of which we have had such bitter experience in Orissa. In the winter and spring it was certainly less than to the north. On the 3rd April it is stated that the sufferings in the Calcutta and Burdwan districts are not so great as in the districts to the northwards, but still becoming very severe; and it is agreed to distribute 50 rupees worth of rice daily in Calcutta, and 25 rupees worth in Burdwan, on the Company's account. It is also mentioned that some of the principal inhabitants among the natives have for some time past in this manner contributed to relieve the distress of many hundreds. In May, June, and July the want of grain in the districts south of the Ganges was terrible, and the crisis awfully severe.

20. In the beginning of June we have another report from the Resident at Moorshedabad. "Up to the end of March," he says, "the ryots hoped for rain, but God was pleased to withhold that blessing till the latter end of May. The scene of misery that intervened, and still continues, shocks humanity too much to bear description. Certain it is that in several parts the living have fed on the dead, and the number that has perished in those provinces that have suffered most, is calculated to have been within these few months as 6 to 16 of the whole inhabitants.

Appendix, No. 8.

On 18th June he says: "rice at six and seven seers per rupee, and several days there have been lately when there was not a grain to be purchased." Much good was derived rom a supply received from Backergunge without which "the Company's immediate attendants even must have starved," but it was comparatively very small in quantity.

On the 12th July we have a further report from the Resident, and then things have reached their climax. He says:—

"The representations I have hitherto made from hence of the misery and distress of the inhabitants for want of grain and provisions, were faint in comparison to the miseries endured in and within 30 miles of the city. Rice only three seers for a rupee, other grain in proportion; and even at these exorbitant prices, not nearly sufficient for the supply of half the inhabitants; so that in the city of Moorshedabad alone, it is calculated that more than 500 are starved daily; and in the villages and country adjacent, the numbers said to perish exceed belief. Every endeavour of the ministers and myself has been exerted to lessen this dreadful calamity. The prospect of the approaching crop is favourable; and we have the comfort to know that the distress of the inhabitants to the northward and eastward of us is greatly relieved from what they have before suffered. In one month we may expect relief from our present distresses from the new harvest, if people survive to gather it in; but the numbers that I am sensible must perish in that interval, and those that I see dying around me greatly affect my feelings of humanity as a man, and make me as a servant to the Company very apprehensive of the consequences that may ensue to the revenues."

21. As almost invariably happens, the long-continued droughts were succeeded by destructive floods, and about this time great damage was thus done to the lowlands in the districts of Rajeshye, Jessore, Dacca, and the eastern districts, by which, as in Orissa, in 1866, the evil was no doubt much aggravated. On 24th July, the Council resolved, that "our hopes of relief from the next crop are by the overflowing of the rivers in the eastern provinces greatly disappointed," and therefore they write to Madras to ask for supplies from thence, matters having by this time greatly improved there.

22. All through August the famine in Bengal continued with unabated severity. On the 31st of that month, the Government write to the Court of Directors: "If the accounts transmitted in our letter of 9th May last of the general calamity which famine had extended to almost every part of these Provinces were truly alarming, how much more so must they now be when we inform you that our miseries have been daily increasing to the present period, nor do we view relief but in a distant prospect. This is an avowed truth that it will be a length of time before the efforts of so horrid a famine will cease to be felt, and ere the country recovers from its present depopulated state."

23. Meantime, however, the prospects of the new crop in all the districts not greatly injured by floods were good. In September there seem to be some symptoms of abatement of the calamity, and the despatches dwell more on all that the country has suffered than in gloomy anticipations. Still there are pitiful cries for assistance from Chandernagore and Cossim bazar which the authorities in Calcutta are little able to meet. Some imports from Chittagong are mentioned. The excessive rains of 1770 have been attended with much sickness among the depressed populations.

24. In October things are decidedly brighter; grain is much cheaper, so much so that on the 22nd October we have the captain of a ship who has been induced to bring a cargo from Madras complaining that he must sell at a loss; and on 14th November we have the following conclusive testimony to the improvement in a Resolution of the Council. "The famine now having entirely ceased, and there being not only a great abundance of rice, but also a prospect of a most plentiful harvest, agreed that the embargo on rice be taken off, and that a publication be issued to that purpose." On the 12th December it is resolved to sell off the rice which has arrived from Madras on Government account as it is not good, and the present plentiful crop renders it unnecessary to lay up such grain.

On 14th December the Government inform the Court of Directors that the famine has entirely ceased.

25. In the later papers we have glimpses of the effects of the famine in particular districts, as in Orissa it was found that the non-agriculturists had suffered most. Here is a passage which reminds me of some of the evidence given during our inquiry. The supervisor of Purneah has great difficulty in obtaining the usual supplies of chunam "since upon inquiry I find that of near 150 mussaldars who delivered chunam in the pergunnahs bordering on Purneah, there are now only five living."

In Rungpore it is said that the greatest part of the land is entirely uncultivated owing to the great scarcity of inhabitants. Of Dinagepore the supervisor says: "The depopulated and ruined state of the district which has ensued from the drought and famine needs no elucidation in your presence;" and he claims credit in account for money disbursed in charity, which however he gradually diminished as rice grew cheaper till the end of December, when he totally abolished it. Rajeshye seems to have suffered in a peculiar degree from the floods following the drought, so much so that, in November 1870, when other districts were recovering, it was supplied by importation from the northern districts and the precincts of Moorshedabad, and between drought and flood "several pergunnahs have been desolated to such a degree as scarcely to pay one part in twenty of their revenue. Grain is still at 18 seers per rupee, while at Moorshedebad it is above 30." The

course of 1770 in Rajeshye s thus summarised. "I need not remind you, gentlemen, what an excessive drought prevailed in the month of February, March, April, and May, which was such as destroyed all the borah and all the paddy which had been sown for the other harvests. After that all the cultivation was at a stand-still till the end of May, when the rains set in with great violence and flooded the lowlands just sown." In Jessore the course of affairs was very similar. The supervisor dwells on "the great mortality last year, and the additional distress that befel this by the inundation that happened in it," and "the dreadful havoc the late famine occasioned, if one may judge from the thinness of its inhabitants, for I observed many houses in different villages I passed through were entirely forsaken."

In the neighbourhood of Moorshedabad, "from the calamity of the season and extraordinary famine, many of the ryots are dead for want of sustenance, many houses are depopulated, and the inhabitants remaining are utterly incapable of industry."

In Bheerbhoom "the bad effects of the late famine appear beyond description dreadful. Many hundreds of villages are entirely depopulated, and even in the large towns there are not a fourth part of the houses inhabited." Hooghly is represented to have "suffered in the most dreadful degree from the effects of the famine and mortality." "I did not conceive that the famine would have been so dreadfully severe as it appears to have been." "One-half of the ryots of Sutsukya were credibly reported to have perished from the famine."

The Resident at the Durbar sums up by saying that "during the last year the provinces laboured under the most severe calamity that any country was ever afflicted with—a continued drought which produced such a famine and mortality among the inhabitants as, I believe, history does not furnish us with an instance of."

26. Notwithstanding these very unfavourable accounts, the new crop was so good, and the demand for rice so sustained, in consequence of the total exhaustion of stocks, that in 1771 the revenue collections were very much better than had been anticipated, and in fact did not show the deficiency which might have been expected to follow such depopulation. "Notwithstanding," says the Government of Bengal to the Court of Directors on the 12th February 1771, "the severity of the late famine, and the great reduction of people thereby, some increase has been made in the settlements both of the Bengal and Behar provinces for the present year, though in some particular parts, where the loss of inhabitants has been greatest, and in others where the succeeding crop has been destroyed by the overflowing of the rivers, we are apprehensive deficiencies will be unavoidable."

The favourable anticipations for that year were justified, for after its conclusion the Government again report "notwithstanding the loss of at least one-third of the inhabitants of the province, and consequent decrease of the cultivation, the net collections of the year 1771 exceeded even those of 1768, as will appear from the following abstract of accounts of the Board of Revenue at Moorshedabad for the last four years:—

	Rs.	*a.*	*p.*
1768 - - - - - - - - - - -	1,52,54,856	9	4
1769, the year of dearth, which was productive of the famine in the following year - -	1,31,49,148	6	3
1770, the year of famine and mortality - -	1,40,06,030	7	3
1771 - - - - - - - - - -	1,57,26,576	10	2

They add, however, "It was naturally to be expected that the diminution of the revenue should have kept an equal pace with the other consequences of so great a calamity. That it did not, was owing to its being kept up violently to its former standard," and they go on to recommend various ameliorations.

27. The subsequent crops continuing to be good, another financial evil was experienced—the too great cheapness of grain, regarding which the Government say:—"It may seem rather a paradox that a circumstance of this kind should affect the revenue more materially than the famine which happened two years ago;" and they go on to account for it thus:—"It appears most probable that the mortality was mostly among the workmen, manufacturers, and people employed in the rivers, who were without the same means of laying by stores of grain as the husbandmen, so that the number of consumers who suffered by this calamity was greater in proportion than that of the cultivators of grain." The bad effects of the cheapness of grain being especially felt in Dinagepore the Collector was directed to receive the revenue in kind, and to build golahs for its reception on the public account.

28. On a review of all that I have been able to gather regarding the famine of 1770, my general impression is that in Lower Bengal it was very similar in character, and in degree of intensity, to the Orissa famine of 1866, but that it prevailed over a larger area, and affected a much greater population.

The British authorities were early alive to the evil, and much sympathised in it, but always with an over-ruling consideration for the revenue; and although early measures of relief were adopted, and they were good of their kind, they were such as would in these days be thought miserably small in proportion to the magnitude of the evil. The account of the Backergunge rice received at Moorshedabad shows only 1,24,506 rupees expended on its purchase; and it is remarked that "the first subscriptions of the Nawab and the minister exceeded ours, and this addition to it makes the account superior." Considering

Appendix, No. 8.

also that they had fed many hundreds by private charity, it was resolved not to ask them for further contributions towards the expenditure of the Company in charity. There is no account of the total sums expended in different districts, but the notices which I have gleaned show that the relief was always on a small scale, except in Patna, where the daily sum allowed was larger.

There was some interference with freedom of trade contrary to modern economical laws, but not to a very great or very injurious extent. Indeed false notions of political economy have never taken very deep root in India. It is in the despatches from England that we find fierce denunciations of those who were suspected of forestalling and regrating, and aggravating the famine by such means. The Government early took measures to prevent the use of undue influence by Europeans in the purchase of grain; and we have the same correspondence between zealous colonels anxious to collect grain for their regiments by sepoy parties, and active civilians objecting to such interference with the people, which have occurred in modern days. Upon the whole, it seems probable that the Government of Bengal were for the most part borne out in their defence of their servants against the charge of trafficking in the necessities of the people which the English public and the Court of Directors brought against them.

29. The next great famine was that of 1783. The disturbance of the season in that year seems to have been general, and occurring in Bengal and Behar while the memory of the disasters of 1770 was still fresh, and at a time when the sufferings of the western countries were very great, it created much alarm; but as the result was not in Bengal so bad as had been expected, and the countries most affected were not then subject to British rule, I have not found much detail to add to the information which we already possessed. From an expression of the Governor General, Warren Hastings, writing from Lucknow in June 1784, it would seem that the upper parts of Hindustan had been visited with extraordinary drought during the *two previous years*. Of the country about Lucknow he says: "This Province although it has suffered less than those which are situated still more to the westward has already felt the fatal influence of the general calamity, both in the loss of its population, and in the diminution of its revenue. It will perhaps be sufficient to inform you that barley and nakood, which form the chief articles of the sustenance of the lower inhabitants of this part of India, sell at present at the rate of 15 seers, though in moderate seasons the average price of them is about a maund and a-half for the rupee. In the same proportions, wheat and all the other kinds of grain have risen in price." In all the famines of which I have information, the present Oudh Province seems to have escaped better than others; and as respects that with which I am at present dealing, although it suffered more than on any other occasion, the description of the Governor General does not suggest such extremities as have been recounted in Bengal and Orissa. But there can be no doubt of the frightful extremities then suffered in the Punjab and Western Hindustan, and the alarming rumours of the sufferings of the provinces adjoining the then British territories were so significant that it seems probable that some of the drier districts lower down the Gangetic valley must have suffered more than those about Lucknow.

30. As in 1770, so on this occasion also the famine was preceded by an alarm from Madras. It seems to have been almost the normal state of Madras in those days to have been constantly in want of supplies from Bengal, but in 1782–83 the want rose to the pitch of severe famine. Early in 1782 the collectors of the grain districts of Bengal, "which have fortunately produced very abundant crops this season," are ordered to make purchases on the Company's account for dispatch to Madras; and on 27th September 1782, it is stated "notwithstanding the liberal contributions of charity, we are informed that our united endeavours have hitherto proved inadequate to their subsistence, as hundreds are daily expiring through want." Throughout 1783 the necessities of Madras continued. I have not ascertained how far these were due to natural causes, but that they were at any rate greatly aggravated by war is clear, "when," as the Bengal Council say, "the enemy was at their walls, and by his ravages in every part of the adjacent country had destroyed the cattle, and reduced the inhabitants to the most pressing difficulty to obtain the most common necessaries of life."

31. It was in September and October 1783 that the Bengal Government became alarmed for themselves. There was an abnormal cessation of the rains and extreme drought. In the latter half of September all the Collectors in Behar, as well as the officer in charge of Purneah, sent very alarming reports, and though a few showers in Tirhoot induced the Collector of that district to write more hopefully in the beginning of October, his hopes were disappointed, and the later rain crops certainly failed very generally in all that part of the country. In October 1783 the Governor General made the vivid report of terrible famine in all the countries from beyond Lahore to the Karumansa (the western boundary of Behar), quoted in para. 7, third part of our Report, and the general letter to the Court of Directors of the 23rd of that month is full of the subject. Great apprehensions were felt for the Nawab Nazim's country, and the famine had been already severely felt in all the western countries towards Delhi. To the northward of Calcutta the crops upon the ground have been scorched, and nearly destroyed. The famine "has raged with so much greater severity in its progress to Lahore that multitudes of the inhabitants of the districts beyond the Jumna are already flocking to Lucknow." It is added that these people may be induced to come down to Behar; "we have

have ordered encouragement to be given to them for that purpose, both from the humanity of saving them from the inevitable destruction of a famine, and the lawful desire in such cases of increasing the subjects of the Company's dominions."

The Government hoped that in Bengal "from the superabundance of the crops of last season, from those which have already been gathered in as plentifully as usual in the month of August, and from those remaining to be gathered in the eastern parts of Bengal, which are properly the rice districts, there will be an ample quantity with moderate care to prevent the dreadful effects of a famine." They very liberally and wisely "thought it necessary immediately to take off the duties on grain of every kind, and to allow a free communication of trade from place to place in this article." But at the same time an embargo was laid on exportation by sea, except to the extent of the contracts already made for the supply of Madras, since it was ascertained that tonnage was engaged to export no less than 1,100,000 maunds, and such an export would, in the opinion of the Government, have been ruinous to the country.

32. Feeling acutely the remembrance of the former famine, and influenced, no doubt, by the character of the instructions received from home on that occasion, the Government of 1783 exercised a much more active interference with the grain trade than in 1770. A "committee of grain" was at once appointed with full powers to regulate all dealings in the article, and to superintend the price, distribution, and sale of rice throughout all the provinces, the members of the committee being put "under the most sacred oath to derive no advantage, directly or indirectly, from their trusts." The permission to export beyond the provinces seems to have been soon revoked. The committee of grain were authorised to establish granaries at Patna and other places. Soon after, on 30th November, the Government say that "the reports respecting the December crops are favourable from many parts of Bengal, but particularly from the eastwards of the Ganges; the north division of the Province of Behar is likely to produce a sufficiency of grain for the consumption of its own inhabitants. We hope, therefore, that by the timely interposition of our authority, we have in a great degree prevented the fatal effects of a scarcity. Indeed the first effects of the alarm have totally subsided, and the markets are everywhere plentifully supplied at rates which the people can easily afford, and this was brought to pass instantaneously on the first regulations which were issued for that purpose." Again they say, "On the one hand, admitting the scarcity to have been artificial, it was founded on the certainty of such a calamity existing in the western districts, and the effects of an uncommon and universal drought throughout the whole. And the shocking experience of a famine in 1770 was still fresh in the memories of most people. If under such appearances we had allowed the exportation of grain to the coast to be continued, and a famine had really ensued, our forbearance would have been alleged as contributing to the cause of it, and we should have received the general execrations of the famished multitude, while we remained the passive spectators of a scene of distress and depopulation all around us, without being able to mitigate its rigour at that late period. *For Bengal, in the event of a general failure of its crops, has no other resort for grain but to its former stores.*"

33. These arguments were principally used to justify the Government against the anticipated complaints of the Madras Government; but the difficulty at Madras was soon after happily remedied by the re-establishment of peace and good crops, insomuch that by the middle of 1784 the price there "even in the greatest time of plenty is seldom so low as it has been since our last despatches to you." Yet there were constantly recurring demands from some quarter, and at this time we find that Bombay and Tellicherry are in want, and it had been necessary to send round shipments to those settlements.

34. The measures of paternal interference adopted in the autumn of 1783, under the supervision of the committee of grain, and for the success of which the Government took so much credit, were of a stringent character. The Collectors were directed "that you do immediately make a progress into the districts under your charge, and by a careful and accurate inquiry ascertain the quantity of grain now in deposit, and by local observation form the best possible judgment of the state of the crops now on the ground, and of the comparative produce of the present with that of past years." It was proclaimed by beat of drum that in case any holder of grain should "conceal it or refuse to bring it to market and sell it at a reasonable price, he will not only be punished himself in a most exemplary manner, but his grain will be seized and distributed among the poor;" and "in any instance where a sudden or extraordinary rise of price is required, you will summon the persons to appear before you and assign their reasons for imposing such increase, and if they appear unsatisfactory, and with a view to extort a personal advantage, you will prevent its having effect by forcing a sale of the grain at a rate which may be deemed reasonable and fair by a number of the principal inhabitants, whom you will call upon for the purpose of fixing a rate of price;" while the offenders were to be held in confinement, and a report made on their conduct. All this was recommended to the serious and particular attention of the officials, "more especially as the dominions of the Vizeer are threatened with a famine, and will require every aid which the Company's districts can afford, consistently with their own safety."

35. In December 1783 Mr. Shore was in Behar making a special report on that

Appendix, No. 8.

province. From his statement is is clear that the province had suffered very serious injury, most of the later rain crops being, he says, lost, and the prospects of the winter crops very unfavourable. From other notices it also appears that great injury was sustained in Purneah, Bheerbhoom, and parts of Rajeshye, but there was an especially abundant crop in Rungpore, and a good one in Sylhet and other eastern districts. The Behar merchants derived considerable supplies from the Chota Nagpore country.

36. The Bengal Council were somewhat too sanguine in assuming the entire removal of alarm before the end of 1783. In the beginning of 1784 there was evidently still a good deal of pressure and alarm, and in February the Government, feeling themselves unable with safety to send assistance to Madras, sent to Batavia for rice from that settlement. Still they say on 9th February 1784 that the appointment of a committee of grain with very extensive powers, and their exertions have had so good an effect, that although the scarcity has not been entirely removed, the alarm of the natives has in a great measure subsided. The Governor General recommended, and the Council strongly supported, that buildings of solid masonry should be constructed to serve the purpose of perpetual granaries to the two provinces. It is stated that some grain which had been long kept in store in golahs in Fort William as an experiment, was found when the golahs were opened to be in perfect condition and sold well. And on a plan of the chief engineer is was resolved at once to erect a circular building at Patna for the purposes mentioned in the Governor General's Minute.

37. On the 28th February 1784 it is confidently reported that "the distresses of these and the neighbouring provinces have much abated." The season, 1784, proved early and favourable, and it may be presumed that the letter of the Governor General from Lucknow in June of that year (already quoted) was near the closing scene of the distress in the Upper Provinces. By August all apprehensions had been removed from the minds of the Government, and before the end of the year a very abundant harvest had enabled them to take off the embargo on the exportation of grain. They conclude, "We think no caution can be too great when the lives of millions are concerned, as in the present case."

38. The general alarm was thus removed, and general plenty secured, but at this time there was terrible distress in some of those very eastern districts which had produced abundantly in the general dearth of 1783. As usual the long drought was succeeded by great floods in 1784, and on 1st December of that year the Government report that the provinces of Tipperah, Sylhet, and Dacca have suffered great distresses from inundations. They refer to the Collector of Sylhet's letter, quoted in the 20th para. of the 3rd part of our Report. I have not found further contemporaneous details regarding this calamity, but that it was very wide-spreading and severe, is shown by subsequent expressions in the papers regarding the floods of 1787, in which for comparison repeated reference is made to the horrors of 1784.

39. The year 1787 was one of the most extraordinary and persistent disturbance, of a character the opposite of that of the years of great drought. From the beginning to the end of the season there was one continued succession of excessive rains, floods, and storms.

40. From several of the reports of the Collectors it appears that the rains commenced abnormally early and continued for months almost without cessation. In some of the districts of Bengal it stated that from the latter part of March to the latter half of July they had continued with such violence as almost to render cultivation impossible: and in Behar from the beginning of June to the same period a similar state of things prevailed. By that time terrible damage had been done in the eastern districts, the inhabitants driven from their homes, the cattle drowned, and general alarm and scarcity prevailing. There was a break in the rains and some fine weather about the end of July, but that was succeeded by fresh violent inundations; and again early in September the waters were out as widely as ever, so that as the Collector of Sylhet pathetically remarks, "after three separate attempts to sow their lands the ryots again find all their hopes vanished, and now the season is gone." From Jessore, Nuddea, and Central Bengal, there are also grievous complaints of frightful inundations in the middle of September. In the end of September there were renewed accounts of great storms and inundations in Behar, and about the 30th September and 1st October, a tremendous storm of rain and wind swept over all the western districts of Bengal, doing immense damage. According to the Collector of Midnapore, "vast torrents rushed down from the westward, and on the ensuing morning I had the melancholy prospect of seeing an ocean passing with great rapidity, carrying down houses and cattle, men, women, and children." The Collector of Bheerbhoom at first laconically reports "all is not lost, but I dread to inquire how much is;" and there are other accounts similar to that given from Midnapore. The town of Burdwan was "totally destroyed, not a vestige of a mud-house remaining, and even those built of brick are many of them fallen."

41. The crisis and conclusion of all this series of calamities occurred on 2nd November, when a cyclone of quite unexampled extent seems to have swept across almost the whole of Bengal. We find similar complaints from districts so widely separated as Midnapore and Sylhet. In Midnapore the storm raged on the 1st and 2nd November. It reached Sylhet on the morning of the 2nd, first blowing from north-east with great violence, and heavy rain

rain till three in the afternoon, when it changed to east, and rising to a furious hurricane carried everything before it. By this disaster the late crops, which after all previous disasters were first getting into ear, were in great measure destroyed over large tracts of country.

42. Great as these calamities were, and reaching to the very utmost of all that seems possible from flood, they did not result in general famine throughout the country. As remarked by the Government, the inundations affected some parts more than others. They speak of the miseries suffered in *several* districts. Although the complaints from Behar were very loud, the general result there cannot have been altogether bad, since it was possible to export grain for the relief of Dacca, from parts of that province where the crops had been abundant. In Nuddea and the neighbouring districts the early rice had been for the most part well harvested before the great inundations reached that part of the country. But in some of the eastern districts there was severe famine. In Rungpore large numbers of starving people flocked into the station and were fed by the Collector. Coarse rice sold at 23, and in some places at 18, seers per rupee, prices then considered famine rates in that part of the country. In Sylhet, after the final storm of 2nd November, the Collector reports that there were in the station upwards of 6,000 people who were daily supplied with rice, and of these many had died near his house. The mortality in Rungpore, he adds, must have been great indeed. In the hill country bordering on Sylhet, Lieutenant Davidson came on great scenes of distress, and it was found necessary to send 20,000 maunds of rice for the support of these people driven to plunder by hunger. The Collector of Dacca speaks of great mortality caused by the scarcity of grain. The general market was so considerably affected by the demand for the supply of the distressed districts that on 28th January 1788 the Government "taking into consideration the dearness of grain at Moorshedabad, Dacca, and some other parts of the country, not excepting the town of Calcutta, owing to the inundations which have affected the crops and the violent storm at the beginning of November," thought it necessary again to lay an embargo on the exportation of grain; and as before proclaimed, that any persons guilty of withholding their grain from the public market should be punished by the confiscation of the grain, and by such other penalties as the occasion may require. By June the distresses at Dacca and other parts of the country had been much relieved, there were favourable prospects for the next season, and the effect on the revenue of the calamities of the past year had proved less than was apprehended.

43. On the whole, the result of a nearer view of the great famines of the last century is somewhat to detract from our conception of their enormity as calamities of a totally different scale and character from those of modern days. The famines of 1770 and 1783 were undoubtedly more wide-spreading than any of those this century; but it has been seen that the western limit of that of 1770 can be fixed with some accuracy as not extending far beyond the frontier of Behar, while in 1783 severe famine did not extend eastwards very far beyond the same line. The experience of 1770 proves, I think sufficiently, that Bengal Proper is unfortunately liable to the same calamity as other parts of India; and taking together 1770 and 1866, I think I may say that the inference to be drawn is, that in countries which depend almost exclusively for the food of the people on the single staple of rice, famine, when it does come, is more severely felt than in countries where the staples and the seasons of production are more varied, and where a considerable quantity of grain is always raised by an unfailing artificial irrigation. Both in Lower Bengal in 1770, and in Orissa in 1866, the scarcity of food was much greater, and prices rose very much higher, than on any other occasion in any of the provinces of which I have exact information. Rice on both occasions was as high as three seers per rupee in regular and important markets, and in many places was not to be had for money, or was sold at still higher prices; whereas in the other famines of which we have any details, the highest famine prices in Oude, the North West Provinces, and the Madras territories, have ranged from seven or eight to 15 seers per rupeee, and food has always been procurable for money. Only in the countries still further to the west many greater extremities have been suffered in 1783, but of the prices there prevailing, or other details, I have no precise information.

44. From all that I have been able to learn regarding the history of the various famines, I would deduce the following conclusions:—

1. That the general climatic system of India is subject to extraordinary disturbances in particular years, by which extreme failures of the food supply are caused and will be caused.

2. But that owing to the varieties of soil, products, seasons, and habits, no such disturbance of which we have any accurate information has produced simultaneous extreme failure of food in all, or the greater portion of the various provinces of the empire; that on the contrary, for famine purposes, the country may be roughly divided into zones in regard to which it may be hoped that failure will not be wholly simultaneous. In the great plains of the Ganges and Upper Indus the zones may be somewhat as follows:—

Eastern Bengal,
Middle and Western Bengal and Behar,
The North West Provinces and Oude,
The Delhi country and the Punjab,

Appendix, No. 8.

or possibly—The lower portions of the North West Provinces and Oude.
The upper portions of the North West Provinces and the Delhi country.
The Punjab.

It may also well be that the lower portions of the North West Provinces and Behar might be involved in a common failure.

3. That looking to the fatal effects of a failure of the rice crop in the countries of the lower Ganges which are not supplied by artificial irrigation, and the known frightful results of famine in the Punjab in 1783, efforts should be made to supply irrigation to those countries as far as is compatible with financial necessities.

4. And that, above all, the means of inter-communication should be placed on such a footing that they may really be efficient to supply the millions of one province from the abundance of others, in case of future famine.

45. It will doubtless always be remembered that, to transport food sufficient for the supply of great masses of population, we shall require means of carriage far beyond the requirements of any ordinary trade. The line of the Oude and Rohilcund Railway, which has now been sanctioned, communicating with the more navigable waters of the Ganges, will, in conjunction with the East Indian Railway, afford a double line of communication between the Upper and Lower Gangetic countries; and by the time that both lines are doubled, and that their traffic arrangements are rendered thoroughly efficient, it may be hoped that these lines, aided by water carriage, will suffice to render available the resources of one zone of the country to the necessities of another. I will only venture to express again a hope that this end may be attained before another famine overtakes us.

46. I would further urge the extreme desirableness of pushing on the means of communication between the Punjab and the Gangetic country, the conditions of which are so dissimilar that it has usually happened that want in one has been accompanied by great abundance in the other. The completion of the line of railway in course of construction will, if the line be doubled, supply one good communication, but the Delhi and East Indian lines run for some hundreds of miles to the south-east of the Punjab territory, through the driest part of the Gangetic countries, and those which afford the least contrast to the Punjab. It would seem still more important for the interchange of commodities to put the dry Punjab in communication with the moist countries of Rohilcund and Northern Oude. I would suggest for consideration that this might be effected by filling in a missing link of about 70 miles from Meerut to Mooradabad, to unite the Punjab line with the Oude and Rohilcund line as now projected. I cannot but think that this line, on which the normal every day traffic in salt and sugar alone would be enormous, is more important to the interests of the people than what I may call the pleasure line from Mooradabad to Nynee Tall, which is part of the present scheme. All Rohilcund and Northern Oude are supplied with salt from Delhi, and there is an immense and constant return trade in sugar, besides the varied course of trade in many other articles. In case the Western Jumna Canal is remodelled (as has long been recommended) and a canal is made from the Upper Sutlej, water communication between the Punjab and the Gangetic countries might also be established.

George Campbell.

Appendix, No. 9.

PAPERS handed in by Colonel *Fife* and referred to in his Evidence, Q. 2126.

(No. 2736 of 1874.—Revenue Department.) Appendix, No. 9.

MEMORANDUM.

Bombay Castle, 29 May 1874.

THE Chief Secretary to Government presents his compliments to the Under Secretary to Government in the Irrigation Department, and begs to forward him a copy of the Commissioner in Sind's Revenue Report for 1872-73, prior to the issue of the Resolution on it. He requests Colonel Fife's attention to paras. 12, 13, and 24, as well as to para. 25 of the Report for 1871-72, and paras. 9 and 10 of Government Resolution No. 5183, dated the 12th September last. The land revenue in Sind is certainly not in a satisfactory condition at present. For two years it has been retrograding. No doubt this may be partly attributable to temporary and local causes, such as floods, breaches in bunds, and the like, and the action of the Civil Courts and of the Settlement Department may have had their share in the result. Nevertheless, the Commissioner in Sind persistently urges on this Department the insufficiency of the grants for the maintenance of Canals as the reason why no improvement takes place. The Chief Secretary will, therefore, be glad if Colonel Fife will inform him whether any *definite* and *distinct* proposals for the improvement of Canals, and for their better maintenance, have been received from the Commissioner in Sind during the last three or four years, and, if so, what has been done on them. Has Sir William Merewether ever brought to notice any instance of the revenue of a particular canal falling off for want of maintenance money? The Commissioner's complaint is unceasing, but it never takes any tangible form in his letters to this Department. The Chief Secretary, therefore, trusts that Colonel Fife will favour him with the information he has asked for, as well as with his general views as to the grounds which exist for the complaint. If the Commissioner has, as it must be presumed he has, well weighed his words in saying that with a proper allotment of money the land revenue of Sind would increase 50 per cent., *i.e.*, by 22 lacs in 10 years, then it would be folly not to give him more money. In any case, there seems something wrong. The land revenue of Sind, till a few years ago, increased by enormous strides every year, and now is beginning to go back.

J. Monteath,
For Chief Secretary to Government.

(No. 246 I. of 1874.)

MEMORANDUM.

Poona, 22 June 1874.

SIND has the sea on the south side, the Great Eastern Desert on the east, and the Beloochistan Hills, which are little better than desert, on the west and north. It cannot, therefore, draw in people to cultivate its plain very rapidly. Since it became British territory it has drawn in some people from its north-west frontier and across the Eastern Desert from Marwar.

2. The revenue of the province cannot increase very rapidly, except by *improvement* to the canals, which reduces the labour of irrigation. Mere clearance, that is digging out a canal, cannot do more than maintain revenue where the population is limited. By large outlay for such work cultivation may be increased on a canal, but the labour available for agriculture being limited, there must be a corresponding falling off elsewhere. Where there has been a large and permanent improvement in the revenue, it has been effected by *raising the water level* of the canals, and giving them a supply of water for a longer period during the year. The Bigaree has been so improved and being on the north-west frontier, where the people, who formerly lived by plunder, have been kept in order, and have taken to agriculture, its revenue has greatly increased during the past 20 years. But a much more marked instance of improvement is the Gharr, the level of which was raised three feet, and where a large tract of country formerly irrigated with the aid of wheels is now irrigated by natural flow. The effect of setting a large number of people and cattle free, whose labour

Appendix, No. 9.

was formerly employed upon raising water and laborious annual digging out of small but deep field channels, was to at once enormously increase the area of cultivation. The Fullaili has been similarly improved, but not to so great an extent, as there was not the same facility, the Western Narra having been used to supply the Gharr. It has been said by some people that the Western Narra was sacrificed for the purpose. I do not myself think that the Western Narra suffered materially. However, there is no branch of the Indus available for the Fullaili or other canals, and, consequently, improvement has not been so marked. The Eastern Narra canals, constructed during the past 15 years, supply the water at a high level, and the result has been a considerable revenue, which is paid by a very small number of people, the labour and cost of irrigation in that district having been reduced to a minimum. There have been improvements to many of the smaller canals in Sind, but they have not been so marked, as they were not so considerable, there being less facility for improving the levels.

3. The following figures show the gross land revenue during the past 20 years, and the improvement cannot but be considered as extremely satisfactory, considering the circumstances. The period is limited to 20 years, as previous to 1853-54 territorial changes took place, which make comparison of revenue figures useless:—

YEARS.	Revenue.	Revenue Averages for periods of Four Years.
	Rs.	*Rs.*
1853-54	28,30,282	
1854-55	35,13,351	
1855-56	30,88,412	32,15,740
1856-57	34,30,917	
1857-58	37,35,173	
1858-59	34,41,411	
1859-60	34,51,971	35,41,988
1860-61	35,39,398	
1861-62	40,68,851	
1862-63	44,01,744	
1863-64	44,89,786	43,19,138
1864-65	43,16,172	
1865-66	36,93,314	
1866-67	42,11,071	
1867-68	41,05,319	41,05,333
1868-69	44,11,630	
1869-70	46,37,292	
1870-71	46,41,918	47,20,711
1871-72	46,88,209	
1872-73	49,15,425	

4. The fluctuations are caused by alterations in the assessments,—cultivation on land in the desert and in the hills, when there happens to be sufficient rain, and cultivation on land inundated by the river, the area of which is very variable. The rates of assessment have not varied so much in the latter years of the series as at the commencement. As a rule they have not been increased during the whole period, so that the increase in the gross land revenue really represents pretty fairly the degree of prosperity which has been attained during the period of 20 years.

5. The remissions are excluded in the figures given, which represent the gross revenue. They are made principally for damage caused by locusts, and for crops destroyed by floods, *i.e.*, too much water. Their amount increases, of course, as the spread of cultivation increases. In considering the progress of irrigation, the remissions, if deducted from the revenue figures, will entirely mislead, unless such portion be deducted as is distinctly due to want of water in the canals. I am not aware of any considerable remission on the latter account of late years in Sind, except in the case of the Buggar branch of the Indus, whose supply fell short last year on account of a serious change which took place in the natural channels of the river. But this had nothing to do with the canal clearances. It was a mishap which occurs from time to time in Sind, and will continue till we so improve the system of canals as to be secure from injury from changes in the natural channels.

6. Instances have come to my knowledge in which the present settlement system in Sind has created an apparent want of water in the canals. People on the upper part of a canal, who have as much as three or four times the area of land given to them as they are supposed to cultivate annually, on the understanding that fallows will be allowed, either give up the fallows altogether, or reduce their frequency. The expenditure of water is thus suddenly increased, and the supply lower down the canal falls short. The people, whose crops suffer from short supply, can, of course, claim remission. It was reported to me last year that in the northern part of the Hydrabad Collectorate people took up land for a short period, and after exhausting it by over-cropping threw it up, and then took up land elsewhere. There being abundance of land in Sind, compared to the population, of course it is not difficult to abuse the liberality of Government in the settlement arrangements.

7. If

Appendix, No. 9.

7. If the agriculture were carried on with the aid of rain, as in the Dekkan, and the water for it cost nothing, it would, of course, be of less importance to fallow the land. But the water costs a great deal of money and annual labour to put upon the fields, and wasting it on exhausted soil, which ought to be fallowed, is injurious to both Government and the people. The water which costs in some places as much as 11 annas an acre for maintenance alone, and exclusive of all charges for interest for original capital laid out on construction of the works, is wasted, and the people's labour, which used to be applied to fertile soil, is also wasted.

8. If the progress of irrigation and the prosperity of the Province have not been so satisfactory of late years as they used to be, I can only attribute it to the settlements which have been attempted. I say attempted, because, though they have been nominally introduced, it is known to, I believe, every revenue officer in Sind that they are so utterly unsuited to a country dependent upon irrigation from large canals, some of the best of which are nearly 100 miles in length, that remissions must be constant.

9. The population of Sind, according to the last census taken in 1872, is 2,192,415. The gross land revenue in 1872–73 was 49,15,425 rupees, or at the rate of 2·24 rupees per head; where the water supply is good, *i.e.*, lasting for a long period during the year, and flowing on to the fields without labour and expense of machinery the revenue is over five rupees per head; where circumstances are unfavourable, as in the northern part of the Hydrabad Collectorate, it is in places only 1¼ rupees per head.

10. I have given the above brief description of the progress of irrigation in Sind, as it is impossible to deal with the vague assertions that are occasionally made, unless the facts I have mentioned are kept distinctly in view.

11. With reference to the remarks in the Memorandum of the Chief Secretary to Government, No. 2736, dated 29th ultimo, I would suggest that an examination be made of the remission figures of the revenue reports of the past 20 years, in order that it may be seen whether remissions on account of want of water have materially increased. It must be borne in mind that it is impossible with unregulated canals, dependent for their supply of water upon the rise of the Indus, which varies every year, to obtain enough, and no more, water than is actually required each year. If the canals, nearly all of which have no regulators at their heads, draw off enough water during an unfavourable inundation, they draw off too much during a good one, and crops get too much water.

12. The Commissioner in Sind has often in this department reported that the money allowed for the annual clearances is utterly insufficient; but, though endeavour is constantly made to discover where the canals have suffered injury from this cause, the result so far has been unsuccessful. The sum placed at the Commissioner's disposal for the clearances is 4,50,000 rupees, and besides this there is a sum of 1,10,950 rupees for clearance of canals, specially provided for in the annual budget, making altogether 5,60,950 rupees, exclusive of all charges for establishment.

The following new works and improvements are under execution :—

WORKS.	Amount of Estimate.	Sum allotted for Expenditure during the Year.
	Rs.	*Rs.*
Bigaree Canal - - - - -	4,31,315	75,000
Sukkur do. - - - - -	7,98,689	76,000
Mitrow do. - - - - -	7,14,452	30,694
Desert do. - - - - -	8,54,811	1,20,000
Thur do. - - - - -	2,02,170	50,000
Dinhaw do. - - - - -	19,702	6,000
Eastern Narra - - - - -	3,03,765	47,000
Great Marruck Canal - - - -	1,62,215	66,000
Alibhur Kutcherry Canal - - -	19,702	5,000
Western Narra Gillespiewah - - -	33,057	33,000
Arul - - - - - - -	56,406	21,000
Gooni Canal - - - - -	91,442	47,000
Pinyari - - - - - -	12,900	12,900

13. The amounts allotted for the year are as much as can be judiciously laid out, labour being scarce.

14. All the works mentioned in the above list are being carried out on regular plans and estimates.

Appendix, No. 9.

15. I can only attribute the frequent requests of the Commissioner in Sind, that the sum allotted for the maintenance of the canals to be spent without plans and estimates may be increased, to a misconception on his part as to the cause of the large rise in the revenue which has taken place in some of the canals. He probably assumes that because the Jacobabad district has improved, and that the work done there was mainly in digging out or clearing an old canal, it is only necessary to do the same kind of work at other places to produce a similar effect. But he forgets that in other parts of Sind, including the Eastern Narra, the people did not live by plunder, and were already engaged in agriculture, and that any considerable extension of agriculture was only to be obtained by improving the means of irrigation and lessening the labour necessary to cultivate an acre of land. Possibly, also, the Commissioner thinks that the difficulty which the settlements have brought upon us, by disturbing the distribution of water and inducing the people to reduce the number of fallows, may be overcome by a large expenditure for clearing the canals without regular surveys, plans, and estimates. So far, however, from a lavish or reckless expenditure meeting the evil, I am sure it would only make it worse. It would lead to a large rise in the price of labour, which is already dear, and increase the extent of clearance to be annually done. In fact, we should very soon find that more labour and expense was required than before to maintain a larger supply of water in unimproved canals, and to produce the same revenue on a larger area of exhausted soil. The labour of the limited population would not be so well applied as it is now, and there would be retrogression in the revenues and general prosperity of the province.

16. I can state positively that the establishments for the works have never been so strong and efficient, nor the expenditure on the works of all kind so liberal as during the past seven years. Curiously enough, the increased care which has been bestowed by Government on the irrigation works of Sind, commenced just before Sir William Merewether became Commissioner, and his period of administration has thus had the full benefit of it.

17. I would suggest a close analysis of the revenue and remission figures for the past 20 years. Cultivation from rain, or "Barani," has nothing to do with the canals, and might be eliminated altogether, as it is shown under a distinct head in the Revenue Returns. It would be desirable also to eliminate the revenue derived from lands inundated by the Indus, but this cannot be done. Canal and inundation revenue were not kept sufficiently distinct during the early years at any rate of the series, and an attempt to separate them now would be useless. The just separation of the two is the more difficult from the inundation revenue being obtained, in many instances, from canal lands. A high inundation will sometimes submerge a tract of irrigated land and destroy the canal revenue of the season, the canal being in the highest state of efficiency. There may be some error from not eliminating revenue on inundated lands, but it forms a fraction only of the whole revenue, and will not mislead if the averages of several years, and not the revenue of each separate year, be compared. I have attempted to explain the condition of irrigation revenue matters in Sind, with the aid of such general knowledge as I possess. The analysis I have suggested will probably make the subject much clearer.

(signed) *J. G. Fife*, Colonel, R.E.,
Under Secretary to Government.

(No. 5163.—Revenue Department.)

ANNUAL REPORTS.

Bombay Castle, 26 September 1874.

Letter from the Commissioners in Sind, No. 1109, dated 26th March 1874, submitting the Annual Report on the Revenue Administration of that Province for the Year 1872–73.

Memorandum from the Irrigation Department, No. 246 I., dated 22nd June 1874, communicating, in reference to this Department Memorandum No. 2736, dated 27th May last, Observations on Sir William Merewether's Remarks on the insufficiency of the Canal Clearance Grants.

Memorandum from the Under Secretary to Government, Public Works Department, Irrigation Branch, No. 316 I., dated 12th August 1874, requesting in reply to this Department Memorandum No. 4088, dated 3rd idem, that the subject therein referred to regarding Grants for the Improvement of Canals, &c., may be transferred to the Irrigation Department.

RESOLUTION.

The inundation appears to have been an extraordinary heavy one, and combined on the right bank with serious floods from the hills west of Sind, to have been the cause of very extensive damage to crops and loss to cultivators. The rainfall was abundant. Locusts did some damage, and there was great mortality amongst horses owing to an epidemic.

Appendix, No. 9.

Land Revenue.

2. The following Table gives the results of the year:—

Gross Revenue.

	1871–72.	1873–74.	Increase.	Decrease.
	Rs.	*Rs.*	*Rs.*	*Rs.*
Frontier	2,79,490	3,01,100	21,609	—
Shikárpur	19,68,055	19,60,653	- -	7,401
Haidarabad	13,57,539	14,06,480	48,941	—
Kurrachee	8,16,363	8,63,356	46,993	—
Thar and Párkar	2,73,763	3,83,835	1,10,071	—
Total	46,95,210	49,15,424	2,27,614	7,401
Deduct alienations	4,56,619	4,51,771	- -	4,848
Government gross realisable revenue	42,38,591	44,63,653	2,25,062	—
Deduct remissions	1,49,931	3,80,366	2,30,435	—
Revenue for collection	40,88,660	40,83,287	- -	5,373
Collections during the year	39,66,786	39,39,458	- -	27,328
Balances of the year	1,21,874	1,43,829	21,955	—
Balances of former years still uncollected	17,485	12,683	- -	4,802

3. The Government Revenue, therefore, amounted to 44,63,653 rupees, or 2¼ lacs more than in 1871–72. Of this the canal revenue came to 35,03,969 rupees, leaving 9,59,684 rupees as the revenue derived from Barani or rain land, from alluvial lands, and other sources. The corresponding figures in 1871–72 were 34,20,595 rupees and 8,17,996 rupees. The increase in canal revenue has, therefore, been 83,374 rupees, and in that derived from other sources, 1,41,688 rupees.

4. The increase in the above gross Government revenue, that is in revenue without allowing for remissions, has been contributed by all the five districts, except the important one of Shikárpur, which again exhibits a small falling off. The increase in gross canal revenue,* however, is to be divided as follows:—

* *i.e.*, Canal revenue without deducting the cost of clearances the year before.

	1871–72.	1872–73.	Increase.	Decrease.
	Rs.	*Rs.*	*Rs.*	*Rs.*
Kurrachee	5,71,463	5,58,431	- -	13,032
Haidaradad	10,01,321	10,45,144	43,823	—
Shikárpur	14,17,275	13,91,832	- -	25,443
Frontier	2,14,618	1,85,881	- -	28,737
Thar and Párkar	2,15,918	3,22,681	1,06,763	—
Total	34,20,595	35,03,969	1,50,586	67,212
Deduct decrease	- -	- -	67,212	
Net Increase	- -	- -	83,374	

From this it is apparent that the gross canal revenue has fallen off in three out of the five districts in spite of an expenditure of 2,84,763 rupees more in canal clearances than in 1870–71, as per margin, an expenditure which has caused the net canal revenue, *i.e.*, the revenue *minus* the cost of clearances, to fall off by 2,01,389 rupees.

	Rs.
1871–72	8,11,357
1870–71	5,26,594
Increase in 1871–72	2,84,763

5. The Commissioner complains that the canal expenditure in 1870–71 was far too low, and Government gather from his 13th paragraph that had it been higher in that year, the results of 1872–73 would have shown themselves more than they have doue; instead, in fact, of the high expenditure resulting in only an increase of 83,374 rupees in gross canal revenue, and an ultimate loss of two lacs of rupees to Government, that there would have been a profit upon it. In his 24th paragraph the Commissioner states that the failure of water supply has been repeatedly urged upon Government, and he hopes it will be early remedied, as there can be no greater mistake than to stint canal money in a country like Sind.

6. The question of the grant to be made for annual canal clearances rests with the Irriga-

Appendix, No. 9.

tion Department, and Sir William Merewether's remarks will be transferred to that department for consideration and disposal. That department should, however, be urged definitely to dispose of Sir William Merewether's complaints as soon as possible, and it should be suggested that a special examination might with advantage be made into the state of a few of the principal canals which the Commissioner may represent as being insufficiently cleared and as deteriorating in consequence both in condition and revenue during the past few years.

7. It should at the same time be remarked in the Revenue Department that the figures of Sir William Merewether's reports do not seem quite to bear out his case. In the first place the expenditure on canals has, during the three years ending with 1871–72, exceeded five lacs in two years, and eight lacs in the third; while during the nine preceding years it only twice exceeded five lacs, ranging between that sum and four lacs. The grants, therefore, which the Irrigation Department have made of late years do not seem to have been illiberal. The canal revenue of 1872–73 did not, as the figures given above show, recoup Government for the excessive expenditure in 1871–72. On the contrary, the revenue fell off almost everywhere. This can hardly have been due to the state of the canals, over eight lacs having been spent on them. The remission figures too, do not point to the canals having been working badly. Of the total revenue remitted, amounting to nearly four lacs, 2¾ lacs are due to floods and ¾ of a lac to locusts, while failure of crops is accountable for only 34,839. Of this, 32,083 rupees are in the Kurrachee Collectorate alone, and out of it only 23,515 rupees are set down to want of canal water, the same being probably due to the River Indus deserting the mouth of its largest branch in that Collectorate, as mentioned in para 3 of the Report. It may be that but for the high inundation and floods, the canals would have suffered from a deficiency of water, but looking back for a series of years over the Sind Jummabundy Reports, His Excellency in Council notices that the increase of canal revenue has been steady every year, and the fluctuations have been very small, the gross canal revenue having risen from 27,37,914 rupees in 1861–62 to 35,03,969 rupees in 1872–73, the net revenue having risen from 22,54,486 rupees to 28,94,001 rupees in 1871–72.* Though there are many cases which have, no doubt, led to this result, still the improvement could hardly have been so regular, had the canals themselves been steadily getting out of order all the time. The remission figures for the past 12 years also do not point to such being the case. It is true that the headings are vague and do not specify distinctly the amount of damage done for want of water, but the only two headings which can include the remissions on that account do not show any marked increase of late years. The figures are given in the margin. On the other hand, the expenditure of public money in Sind on new works and extensive improvements to old ones has been very large for some time past, and, as is well pointed out in a memorandum that has been drawn up in the Irrigation Department, Sind being a thinly populated country where facilities for immigration are small, mere maintenance of canals can by itself cause but little additions to the revenue, and it is to improvements, which by lessening the cost of irrigation will set free labour and capital to cultivate new waste, that Government must look for increased revenues. On such improvements Government have been and are spending large sums of money.

Remissions.

——	On Account of Failure of Crops.	On Account of other † Causes.
	Rs.	*Rs.*
1861–62 -	35,200	5,841
1862–63 -	36,038	60,862
1863–64 -	19,870	58,989
1864–65 -	32,140	10,625
1865–66 -	50,236	4,645
1866–67 -	58,496	9,492
1867–68 -	71,144	9,869
1868–69 -	84,649	33,943
1869–70 -	55,055	56,274
1870–71 -	39,216	29,595
1871–72 -	72,899	24,717
1873–73 -	34,839	10,284
Average -	49,113	26,261

8. At the same time his Excellency in Council admits that the amount spent on maintenance, as distinct from improvement of canals, should certainly be sufficient to keep the canals in order, or the people and land on their banks will certainly suffer, and instead of the

* The following figures show the increase during these years:—

——	Gross Canal Revenue.	Expenditure in the previous Year.	Net Canal Revenue.	——	Gross Canal Revenue.	Expenditure in the previous Year.	Net Canal Revenue.
	Rs.	*Rs.*	*Rs.*		*Rs.*	*Rs.*	*Rs.*
1861–62 - -	27,37,914	4,83,428	22,54,486	1867–68 - -	30,52,856	5,37,901	25,14,955
1862–63 - -	29,66,967	4,24,363	25,42,604	1868–69 - -	31,54,769	4,78,289	26,76,480
1863–64 - -	28,03,608	4,11,894	23,91,714	1869–70 - -	32,44,979	4,94,620	27,50,359
1864–65 - -	30,19,657	5,64,371	24,55,286	1870–71 - -	33,76,227	5,17,197	28,59,030
1865–66 - -	29,93,980	4,12,221	25,81,759	1871–72 - -	34,20,595	5,26,594	28,94,001
1866–67 - -	32,23,551	4,32,341	27,91,210	1872–73 - -	35,03,969	8,11,357	26,92,612

† Other than blight, submersion, destruction of crops, failure of crops.

the small but assured increase of cultivation on these canals, which the accumulation of capital following on regular crops must induce, both cultivation and revenue will eventually fall of. Hence it is necessary that, before improvements are undertaken, the maintenance of existing canals should be sufficiently, but not more than sufficiently, provided for. Now although it appears to Government in this Department that, as far as figures go, no complaint can lie for insufficiency of clearance grants, and that the falling-off in net canal revenue in the year under review is more likely to be set down to the indebtedness of the cultivating classes, to the abandonment of fallows, to the want of care taken of private canals or the like, than to deficiency of money for the maintenance of Government canals, still the Commissioner in Sind is evidently very strongly of opinion that the grants are insufficient. It is, therefore, right, in justice to Sir William Merewether and in the interests of Government, that these doubts should be fully cleared up. It seems, therefore, that a special inquiry, such as has already been suggested, is necessary.

9. Turning again to the Commissioner's Report, Government notice that there is clearly a mistake in the statement embodied in para. 14, which gives the details of land revenue derived from other sources than canals. The revenue from wells is put down as *nil* in the Kurrachee Collectorate and on the frontier, while that in the Haidarabad Collectorate is put down as 324 rupees only. This is evidently wrong, and Government trust that errors of this kind, which destroy all confidence in statistics, will be guarded against in future.

10. The head "Villages and Hamlets" calls for no remark. Under "Alienations" Government notice that there has been a decrease of 4,848 rupees, owing to lapses. The total alienations now amount to 4,51,771 rupees.

11. The following figures give the area of land under each description of cultivation, contrasted with the previous year:—

	1871–72.	1872-73.	Increase in 1872-73.
	Acres.	*Acres.*	*Acres.*
Khurreef - - - -	13,74,573	14,02,058	27,485
Rubbi - - - - -	5,11,692	6,60,903	1,49,211
Peshrus - - - -	3,314	5,764	2,450
Barani - - - -	1,23,281	2,44,398	1,21,117
TOTAL - - -	20,12,860	23,13,123	3,00,263

It is evident that this large increase of cultivated land is, in the case of the first three heads, principally due to the floods, and in the case of Barani it is of course owing to the rain. To the same causes, however, are due the enormous remissions of the year, which render it probable that for every acre of increased cultivation an acre of old cultivation was destroyed.

12. The remissions granted are as follows:—

	1871–72.	1872-73.	Increase in 1872–73.	Per-centage on Government Revenue.
	Rs.	*Rs.*	*Rs.*	
Frontier - - - - -	2,233	7,503	5,270	2·6
Shikárpur - - - - -	26,906	1,21,852	94,946	6·6
Haidarábád - - - - -	19,700	39,465	19,765	3·3
Kurrachee - - - - -	96,117	1,32,812	36,695	17·1
Thar and Parkur - - - -	4,975	78,734	73,759	20·9
Total - - -	1,49,931	3,80,366	2,30,435	—

Year.	Total Remissions.	Per-centage Remissions on Government Revenue.
1853-54 -	2,64,121	10·92
1854-55 -	1,80,338	5·91
1855-56 -	37,212	1·4
1856-57 -	1,19,463	3·98
1857-58 -	84,897	2·64
1858-59 -	34,871	1·2
1859-60 -	31,424	1·07
1860-61 -	74,890	2·46
1861-62 -	41,569	1·16
1862-63 -	1,18,680	3·03
1863-64 -	2,90,978	7·25
1864-65 -	55,203	1·44
1865-66 -	58,863	1·82
1866-67 -	87,472	2·32
1867-68 -	89,931	2 46
1868-69 -	1,32,046	3·33
1869-70 -	3,63,463	8·67
1870-71 -	97,722	2·32
1871-72 -	1,49,931	3·53
1872-73 -	3,80,366	8·52
Average -	1,34,672	3·77

These figures are certainly startling, the aggregate being 8·52 per cent. on the Government land revenue, and being withal the largest amounts which have been given during the last 20 years. The figures given in the margin show that in that space of time remissions have been—

	Rupees.
In four years, below - - -	50,000
In seven years, between - - -	50,000
and - - -	1,00,000
In four years, between - - -	1,00,000
and - - -	1,50,000
In one year, between - - -	1,50,000
and - - -	2,00,000
In two years, between - - -	2,00,000
and - - -	3,00,000

And in two years only, that under review and in 1869-70, they have been more nearly 4 lacs than 3 lacs. The varied amounts show the risk to which cultivation in Sind is subject, and it is to be expected in such a country, where floods and drought in alternate years harass the people, that as the revenue increases so will the remissions. His Excellency in Council quite concurs with the Commissioner in thinking that in times of distress these should be given promptly and liberally, and therefore when, as is now reported, the most careful inquiry has been made in each case, he is quite satisfied that the remissions were necessary.

13. His Excellency in Council notices that the remissions are divided under the following heads:—

Cause.	Amount.	Per-centage.
	Rs.	
Blight - - - - - -	3,510	0·92
Submersion - - - - -	2,66,733	70·01
Failure of crops - - - -	34,839	9·15
Locusts - - - - - -	64,997	17·08
Other causes - - - - -	10,284	2·70

It will be as well in future years to open a heading "Want of Water in Canals." The Table just given shows what a large proportion of the remissions are due to floods, and the attention of the Irrigation Department should, therefore, be specially invited to Sir William Merewether's statement that "with sufficient expenditure in maintenance" (of canals) "and judicious arrangements for protection from ordinary floods, he feels convinced that the revenue would be increased 50 per cent., *i. e.*, by 22 lacs "in 10 years." If this statement were literally correct, it would justify a capital expenditure of 2 crores and 20 lacs of rupees in keeping out floods and maintaining canals, and Government would then gain 10 per cent. It is not, however, to be expected, as has been remarked above, that the mere maintenance of canals will do much to increase the revenue, but undoubtedly the floods must not only be most damaging, but most disheartening, and tend more than anything else to discourage the accumulation of agricultural capital and the extension of cultivation. The subject of controlling them is, however, one for the disposal of the Irrigation or Public Works Department, by whom, it is hoped, some alleviation of the losses that are caused by floods may be found practicable.

14. The outstanding balances for the season, on the 1st August 1873, amounted to the following sums:—

	Balance.	Per-centage on Revenue for Collection.
	Rs.	
Frontier - - - - - -	19,418	6·9
Shikárpur - - - - -	31,968	1·8
Haidarabad - - - - -	29,644	2·5
Kurrachee - - - - -	62,798	9·7
Thar and Parkar - - - -	—	—

Government

Government regret to see the large amount outstanding in the Kurrachee Collectorate, in which the remissions already amount to 17·1 of the Government revenue. In Thar and Parkar, where the proportion of remissions was even heavier, they appear to have been promptly given, and then all the remaining revenue collected. It is very undesirable to have outstandings at all; and while his Excellency in Council is quite aware that in times of plagues great discretion must be reposed in Executive officers, especially when prices are falling, still he would again impress on the Commissioner the desirability of collecting the revenue that is to be collected as quickly as possible. It will be the truest benefit to the distressed people in the end. His Excellency hopes that all outstandings for 1872-73 have been long ago collected or written off. He notices with regret that at the end of the year under review there were still outstandings to the amount of 12,683 rupees on account of previous years. This indicates bad management, and ought not to be allowed to occur again.

Tukavee.

15. The aggregate of Tukavee that has been advanced is small; only *Rs.* 6,210. 8. 0. His Excellency in Council is of opinion that Sind is a country where the provisions of the Land Improvement Act can be worked with peculiar advantage, and where it will be equally profitable both to the Government and the landholders if the latter are put in possession of money at a low rate of interest for digging new canals, building masonry heads, erecting bunds, and the like. His Excellency trusts, therefore, that the provisions of this Act will be brought by the district officers to the notice of such landholders as are likely to benefit from them.

Crops.

16. The following is an abstract of the principal crops that were sown:—

Rice	548,431 acres.
Jowari	478,402 „
Bajri	370,292 „
Oilseeds	326,822 „
Wheat	280,666 „
Cotton	48,803 „
Other products	191,078 „

The only points noticeable in this, are that the cultivation of wheat has increased by 23,532 acres, which may be due to increase demand consequent on the exportation of that grain which commenced when the duty on export was abolished, and that the area under oil seeds is 168,432 acres more than in 1871–72, that is, it has more than doubled itself. This is owing to the vast area of flooded land, which was exposed in the cold season, being unfit for growing wheat or barley. The area under cotton is just a little in excess of the same in the year previous.

17. There is a slight discrepancy between Form F., No. 1 and No. 2, of one acre, which does not call for further remark.

Wells.

18. Government are glad to notice that 97 new wells have been constructed, while 19 were in course of construction at the end of the year. It is presumed these are all pucka wells. If not, the details of pucka and kucha wells should be given. The attention of the Commissioner should be drawn to an error in his 38th paragraph on this subject, in which the acreage watered by certain wells has been added to the number of the wells themselves.

Sayer Revenue.

19. The gross revenues were 18,20,777 rupees, or 2,45,913 rupees less than in 1871–72. Only 8,075 rupees were remitted under special circumstances in the frontier district. There remained 18,12,702 rupees for collection, all of which, save four pies only, was collected within the year. *Rs.* 70. 2. 0. were outstanding in the Thar and Parkar district for the previous year, for which explanation is given.

20. The following statement shows the receipts under each head of Sayer revenue compared with 1871–72:—

	1871–72.	1872–73.	Increase.	Decrease.
	Rs.	*Rs.*	*Rs.*	*Rs.*
Abkari	1,98,333	2,29,450	31,167	—
Drugs	60,435	66,058	5,623	—
Salt	65,059	79,436	14,377	—
Stamps	3,57,057	3,78,491	21,434	—
Income Tax	1,12,712	73,369	- -	39,343
Non-agricultural Tax	1,16,382	8,474	- -	1,07,908
Law and Justice	67,679	64,600	- -	3,079
Opium	81,256	96,295	15,039	—
Forests	2,57,805	2,26,260	- -	31,544
Postal	1,30,655	1,30,609	- -	46
Customs	5,31,832	3,91,438	- -	1,40,393
Ghee Tax	42,008	31,076	- -	10,932
Miscellaneous	45,471	45,215	- -	256

21. The

Appendix, No. 9.

21. The above results are generally satisfactory. It is hoped that the Government of India will soon be in a position to decide on the proposals which have been submitted for the better regulation of salt excise in Sind. The falling off in customs is most noticeable, the collections having fallen to nearly the low point it had reached in 1870–71. This subject can be more suitably noticed in the review of the Collector of Customs' Admistration Report.

22. Government desire to have the Commissioner's opinion as to the necessity of continuing the Thar and Parker Ghee Tax. That tax was instituted as a substitute for the income tax, which would have been wholly unsuitable and profitless there, and is still in existence, although the income tax has been abolished.

23. The entire gross Government revenue of the Province for 1872–73 was 62,84,431 rupees. Deducting remissions, there were 58,95,900 rupees for collection, being a decrease of 2,59,363 rupees in 1872–73. Of this, 57,52,160 rupees were collected during the year, leaving 1,43,829 rupees outstanding, besides 12,753 rupees, the balances of former years. The cost of collection amounted to 6,01,219 rupees, or 17,272 rupees less than in 1871–72. The per-centage on the revenue for collection was *Rs.* 10. 9. 4.

(signed) *F. S. Chapman,*
Chief Secretary to Government.

To The Commissioner in Sind,
The Public Works Department (Irrigation Branch).

Years.	Gross Revenue.	Alienations.	Government Revenue.	Remissions.						Net Revenue for Collection.	Gross Canal Revenue.	Expenditure in the previous Year.	Net Canal Revenue.
				Blight.	Submersion.	Failure of Crops.	Destruction of Crops.	Other Causes.	Total.				
	Rs.	*Rs.*	*Rs.*	*Rs.*	*Rs.*	*Rs.*	*Rs.*	*Rs.*	*Rs.*	*Rs.*	*Rs.*	*Rs.*	*Rs.*
1853–54 -	28,30,281	4,12,158	24,18,123	–	–	–	–	–	2,64,121	21,54,002	—	—	—
1854–55 -	35,13,350	4,84,396	30,48,954	–	–	–	–	–	1,80,338	28,65,616	—	—	—
1855–56 -	30,88,412	4,29,596	26,58,816	–	–	–	–	–	37,212	26,21,604	—	—	—
1856–57 -	35,12,552	5,16,464	29,96,088	–	–	–	–	–	1,19,463	28,76,625	—	—	—
1857–58 -	37,05,149	4,88,981	32,16,167	–	–	–	–	–	84,897	31,31,271	—	—	—
1858–59 -	34,41,411	4,90,436	29,50,975	–	–	–	–	–	34,871	30,04,930	—	—	—
1859–60 -	34,24,545	4,92,978	29,31,566	–	–	–	–	–	31,424	29,00,142	—	—	—
1860–61 -	35,39,447	4,98,105	30,41,342	–	4,790	61,326	–	8,774	74,890	29,66,452	28,82,800	5,55,143	23,27,657
1861–62 -	40,64,125	4,91,077	35,73,047	–	528	35,200	–	5,841	41,569	35,31,478	27,37,914	4,83,428	22,54,486
1862–63 -	44,01,743	4,85,932	39,15,811	–	21,780	36,038	–	60,862	1,18,680	37,97,131	29,66,967	4,24,363	25,42,604
1863–64 -	44,89,785	4,83,093	40,06,691	83,839	1,28,280	19,870	–	58,989	2,90,978	37,15,713	28,03,608	4,11,894	23,91,714
1864–65 -	43,16,173	4,70,653	38,45,519	1,276	11,162	32,140	–	10,625	55,203	37,90,316	30,19,657	5,64,371	24,55,286
1865–66 -	36,93,316	4,59,915	32,33,401	549	38	50,236	3,394	4,645	58,863	31,74,537	29,93,980	4,12,221	25,81,759
1866–67 -	42,11,073	4,49,689	37,61,383	4,343	14,848	58,496	293	9,492	87,472	36,73,911	32,23,551	4,32,341	27,91,210
1867–68 -	41,05,321	4,51,809	36,53,511	736	8,182	71,144	–	9,869	89,931	35,63,580	30,52,856	5,37,901	25,14,955
1868–69 -	44,11,632	4,49,550	39,62,082	9,664	2,269	84,649	1,521	33,943	1,32,046	38,30,036	31,54,769	4,78,289	26,76,480
1869–70 -	46,37,294	4,48,316	41,88,977	1,988	73,450	55,055	1,76,696	56,274	3,63,463	38,25,515	32,44,979	4,94,620	27,50,359
1870–71 -	46,41,918	4,43,451	41,98,466	516	28,394	39,216	–	29,595	97,722	41,00,744	33,76,227	5,17,197	28,59,030
1871–72 -	46,95,212	4,56,619	42,38,593	3,915	48,399	72,899	–	24,717	1,49,931	40,81,658	34,20,595	5,26,594	28,94,001
1872–73 -	49,15,425	4,51,771	44,63,653	3,510	266,733	34,839	64,997	10,284	3,80,366	40,83,287	35,03,969	8,11,357	26,92,612

(No. 1438 of 1875.—Revenue Department.)

Resolution of Government.

Bombay Castle, 10 March 1875.

Discussions have lately taken place on several questions arising out of the Revenue Settlements in Sind, and perhaps none of them are more important than that of the effect which has been and which is likely to be produced by the survey system on the position of the zemindars, which term Government here apply to the large landholders. It is now more than 10 years since the Government of India sanctioned the introduction, into that Province, of the system of settlement previously established in the older parts of the Presidency, and now that the talukas which were first settled for periods of 10 years are coming under revision, his Excellency in Council considers it the most opportune moment for inquiring whether any and what modifications ought to be introduced.

2. His Excellency in Council fears that the application of the ryotwar system to single estates held by large zemindars, some of whom pay thousands of rupees each to Government, is not altogether suitable, and he believes that when the introduction of the new Revenue Survey was sanctioned, the opinion prevailed that the North West Province system of settlement by villages or estates should be adopted in the case of large zemindarees or coparcenery estates.

3. The facts of the case appear to his Excellency in Council somewhat as follows: Independent of the mass of petty proprietorships, similar to the ryotwar holdings in the Deccan,

Deccan, there existed in Sind, at the time of the conquest, a considerable number of large zemindars, who held extensive estates, comprehending waste as well as cultivated lands. Under the Ameers' Government, as well as during the early years of British rule, the assessment was collected in kind, and consisted of a fixed share of the gross produce of the land cultivated for each crop. All landholders, whether large or small, had to pay at the same rate, and the advantage which the large holders enjoyed, consisted partly in their being better able to evade the payment of their fair share, and partly in their being able to levy as rent for themselves from the cultivators a portion of the produce which remained after the Government demand was satisfied. Subsequently, crop rates were introduced, that is to say, a money assessment on each kind of crop, the area of which was learnt by actual measurement; and, finally, the Bombay Revenue Survey system was brought into force. Under this system large and small holders have been treated alike. Cultivated or waste lands were measured and demarcated into fields, which were again separately assessed. The claim of a large holder to be registered as the occupant of all the land he had held under the old system, was admitted; but whereas previously he had only to pay on his actual cultivation, he had for the future to pay the survey assessment on each field, whether it was cultivated or waste.

4. The natural dislike of the Sindees to relinquish any of their hereditary holdings blinded them to the extreme importance of this change of tenure; they insisted on incurring the new liability, and the result has, no doubt, been a considerable addition to the pecuniary difficulties which have been accumulating around them, and from which the Government would gladly see them extricated.

5. Government have no desire to ignore the fact that under the ancient sytem of the Government of the country, these landed gentry of Sind have for some generations been in the enjoyment, more or less undefined, of certain advantages, over waste land, although the Government could, as a last resource, either call on them to cultivate the waste or resign it. Of these advantages it would be neither just nor politic to deprive them by the sudden and rigid introduction of a new mode of collecting the land revenue, which has been found convenient in other parts of the Presidency, where it was not brought into conflict with any such privileges. Sir W. Merewether has proposed that the zemindars should be allowed to hold their waste lands with payment for five years, on condition of paying for any of it that may be cultivated for any crop; and effect has been given to this proposal in one pressing instance; but the question still remains for disposal as to how the holdings of large zemindars in Sind should generally be treated, and a suggestion has been made that the zemindars should, at the settlement, be given leases of their total holdings, whether cultivated or waste, for lump sums calculated at a certain proportion below the aggregate demand fixed on each field by the Survey. The advantage of this would be that an allowance could be made for land already waste, while preserving the *quasi* proprietary right: it would also enable the zemindars to obtain such a return from the land under the plough as would enable them to hire tenants, who are comparatively scarce in Sind, to cultivate the remainder, and the fixing of an unchangeable sum would offer great inducements to them to bring their waste under cultivation.

6. The matter has, together with others of almost equal importance, been lately discussed at several conferences, at which a member of the Government, the Commissioner in Sind, and the following officers were present:—

The Survey and Settlement Commissioner, N. D.
Colonel Haig, Settlement Officer in Sind.
Colonel Wallace, late Acting Settlement Officer and Acting Collector of Hyderabad.
Colonel Dunsterville, Acting Collector of Kurrachee.
Captain Fisher, Deputy Settlement Officer in Sind.
The Dufterdars of Kurrachee and Hyderabad.
Colonel Merriman, Superintending Engineer in Sind, and some of the officers of the Irrigation Department,

at which the following conclusion has been come to.

7. It is the universal opinion of the local officers, and Government, after perusing the correspondence which has previously passed on the subject, have generally come to the same conclusion, that zemindars cannot legally claim a proprietary title in any land they do not cultivate or pay for, and therefore that any concession made them on account of any waste land they may desire to retain must be considered a matter of grace. At the same time they are of opinion that zemindars have certain claims over waste lands which it is only right and politic to respect. Of the two plans that have been proposed with a view to give favourable terms to the zemindars, the officers present were all of opinion that the proposal for giving leases is the preferable one; and the Commissioner in Sind has also stated that, on mature consideration, he has given up the idea of allowing zemindars to retain a lien on the waste lands in their occupancy for a short term of years in favour of the lease plan. This is to include all waste lands there may be any reasonable prospect of a man being able to cultivate permanently or in rotation in a lease for the term of a settlement at a reduction on the whole not exceeding 30 per cent., on condition of his not throwing up any portion during its currency. The members of the conference have endeavoured, but without success, to arrive at a limit, either as to area or amount of assessment, in the case of an individual desirous of having such a concession made to him, and

Appendix, No. 9.

have come to the conclusion that it will be better to leave the settlement of each case in the hands of the Survey officer and Collector, under the sanction of the Commissioner in Sind. There appear to be cases in which the grant of a favourable lease in the manner proposed would be of no advantage whatever to the zemindar, and would merely leave him more than ever at the mercy of his creditors.

8. His Excellency the Governor in Council is pleased to approve of this proposal, and to direct that it be carried out, as far as practicable, over the whole of the surveyed districts of Sind, as soon as possible. He would also take this opportunity of reminding the settlement officer that all rights connected with the soil, such as the rights of "Marosee Harees," and the right of the zemindar to collect "Lapa," should always be carefully inquired into, recorded, and reported on, as directed in paragraph 9 of Government letter to the Commissioner in Sind, No. 3888, dated the 4th November 1863.

9. A further point on which there has been some discussion, is that of the assessment on fallows. Fallows are allowed for in fixing the assessment, and it appears that recently the cultivators have commenced a practice of throwing up land when its turn to lie fallow came, thus depriving the Government of a portion of the assessment. Of the existence of this evil there can be no doubt, and it is quite possible that if it becomes prevalent the loss of revenue may be serious. There is also an objection to the present system of settlement on the part of the Irrigation Department, viz., its tendency to induce holders of land at the heads of canals to appropriate sufficient water to irrigate at once the whole of their land, which has been assessed on the supposition that it will be cultivated in a triennial rotation, at only one-third the fair rate of assessment; they thus deprive people at the tails of water altogether. The canals being calculated to hold only sufficient to allow for one year's cropping, the result on the canal revenue is of course unfavourable, inasmuch as those cultivators at the heads of the canals, who get the larger share of the water, only pay one-thirdof what would be derived from its use, if it were allowed to flow on to the tails and were used for land of other occupants, which would be paid for and bring up the canal revenue to what it was anticipated it would yield. The remedy for this is to hit upon a plan which will have the effect of inducing people to economise water, and the members of the conference have come to the conclusion that people should be obliged to pay full assessment for all the water they take, in place of, as at present, allowing them to hold three times the quantity of land they require for a single year's crop and to pay on it, what would be equivalent to full assessment on one-third on the supposition that probably two-thirds would be left fallow. The advantage to the cultivator of the present system is that if he can manage to crop his land every year without fallowing it, he holds it at one-third its proper rent and thus accumulates capital. If he cannot, however, crop it every year, he may for one year get the full benefit of the whole at one-third of the assessment, and then, there being abundance of waste land, throw it up and take up another piece to treat in the same way, and thus as it were cheat the revenue. There can be no doubt that in some parts of the country this has been done to a considerable extent, although from other land being taken up, the collections have not much fallen off, and the real loss has not therefore made itself conspicuous.

10. But notwithstanding the advantage the system gives it seems almost the universal opinion that it is not looked upon favourably by the great mass of the ryots, who would prefer paying full assessment on what they cultivate to paying a diffused rate on cultivation and fallow together, provided they are protected in places where population is abundant, retain, and there is consequently a great demand for land, from the risk of other people taking up the land they may be obliged to leave fallow for a reasonable time. This fortunately precisely falls in with the views of the Irrigation Department, and enables Government by a modification of the orders in force in the survey with regard to the area of numbers under wheel irrigation, that is to say, by directing that henceforward they should be only sufficiently large to be cultivated under a single wheel in one season, fully to meet also the fallow difficulty. It was the general opinion of the conference that this system of forming wheel survey numbers in all talukas about to be assessed for the first time or revised should be at once carried out. Assessment will then be imposed at full rates and not one-third of them. A man holding wheel land will take up as much as he proposes to cultivate in a single season, and if he chooses will continue to hold it continuously. If he cannot do without fallowing it, he will throw it up on the understanding that he has a lien on it for two years, and that in the third if he does not take it up his right of occupancy lapses, and it may be given out to any one else. Having thus to pay full rates for all water he uses he will naturally economise it, and the objection of the Irrigation Department to the waste of the present system will be removed.

11. The Commissioner in Sind is of opinion that as the system of a diffused rate on cultivation and fallow has the advantage of enabling an industrious man who cultivates the whole of his land year after year, to do so on very favourable terms, he should, at all events, have the option of adhering to it, or of adopting the one now proposed. It was, therefore, agreed at the conference that it would be advisable at the introduction of a settlement to allow all the land in a man's holding usually cultivated on the fallow system to be given to him at the one-third or other diffused rate, on the condition that he should hold it without the option of relinquishing any portion of it for the full 10 years of the settlement. This would not be applied to any rice or sailabee or bárânee land, or to the estates of large zemindars, unless they refuse leases.

12. His

Appendix, No. 9.

12. His Excellency in Council is pleased to accede to the above proposals, and to direct that the necessary arrangements for reducing the size of the numbers should be proceeded with as soon as possible. In cases where the privilege allowed in the last paragraph is sanctioned, separate kuboolayets should always be taken.

13. It has been proposed by Colonel Francis that no unassessed waste should be given out for cultivation, if there be any assessed survey numbers waste at the time. Now a certain amount of assessed numbers will, no doubt, always be liable to remain waste, but his Excellency in Council is inclined to think that the proportion should not be large, and that until 85 per cent. of the assessed numbers have been taken up, no more of the unassessed area should be given out. For it is presumed the survey officers always measure out and separately assess sufficient land to allow for an extension of cultivation, and as the demarcation and assessment of unassessed waste necessitates the presence of a competent survey officer, it is clearly unadvisable to begin it until most of the measured land has already been taken up by the Commissioner. If the Commissioner should consider this order requires reconsideration, his Excellency in Council will gladly give Sir W. Merewether's views his best attention.

14. Another question, to which reference has been made in the papers before Government, is the advisability or otherwise of providing at the settlement a cess over and above the land revenue, and in addition to the local funds cess, for the clearance of canals which are not maintained by Government. On full consideration of this subject, his Excellency in Council is of opinion that it would be unadvisable to levy such a cess. One cess is enough for a country like Sind, and it is quite clear that were funds available, only a fraction of the branch canals could, in any case, be looked after by the district officers. In regard to branch feeders and small canals, the duty of clearing which is imposed by the custom of the country on the communities to which they belong, Government concur in a suggestion which has been made that an Act be passed and the Commissioner in Sind empowered to clear out already existing canals with Government funds, recovering the cost by a rate on the land which is actually watered by the canal. His Excellency in Council requests that the Commissioner will favour him with his detailed opinion as to the best mode of carrying out this proposal. It should be pointed out to him that applications for expenditure under the Land Improvement Act must come from the people themselves. That Act would thus be useless, where the people from sheer apathy, or from want of combination, allow their canals to go to ruin; and it is for these cases, more than any other, that provision must be made now. The other alternative, suggested by the Commissioner, of collecting the people and inducing them to do what is needed under the superintendence of the district officers, savours somewhat of forced labour, which has been formally abolished; and although Government have no doubt that, in the instances alluded to by Sir William Merewether, energetic and trustworthy district officers have frequently, by their force of character, induced the people to do such work cheerfully, still it would not be desirable to make a general practice of it. The people would have under the proposed Act the alternative of keeping the canals in proper order in their own way, or paying for the same work when undertaken by Government. The Act would not apply to canals, the property of single individuals, who may be trusted to take care of their own interests, nor to the main feeders, which are annually cleared at the expense of the State, nor to canals newly made by Government. But it would apply to those canals which are held in joint proprietorship by different tribes or communities, from which land is actually irrigated, and the clearance of which would have, if necessary, been carried out in olden times under a mere order of the Executive.

15. His Excellency in Council fully concurs with the Commissioner in thinking that purely irrigation and purely settlement questions should not be mixed together, and that even to guarantee the expenditure during a term of settlement of any given sum on any given canal, would be an impracticable measure. He does not think, with the Collector of Hyderabad, that settlements should be postponed till the canals are all in first-rate order. The improvement of irrigational works is a matter of time, and their permanency depends greatly on the action of the river. The settlement officers must take the water supply as they find it. If Government increases the supply afterwards, they have power to enhance the assessment; if accidents happen and crops are seriously injured for want of water, or from floods, remissions must be given. His Excellency in Council believes that, though mistakes may have been made in valuing the water supply when settlements were new in Sind, and though the caprice of the river Indus may annually ruin crops as well as lands here and there, still on the whole, the experience that has been gained renders the classification of irrigated fields in Sind now a matter of comparative ease and accuracy, and he has every confidence in the ability of the survey officers now in that province to carry it out in a fair and satisfactory manner.

16. His Excellency in Council is glad to find it recorded that classification of villages, according to the general character of their water supply and their distance from markets, receives and always has received the most careful attention. In one or two reports, which came not very long ago under his Excellency's notice, full information as to the reasons for the departure from what would appear the natural mode of grouping was not given; but his Excellency in Council now notices from the reports before him that more care is being taken in explaining such points. He desires, therefore, to impress on the Survey Commissioner the absolute necessity there exists for entering into the fullest particulars on these

Appendix, No. 9.

subjects, as without such information Government must be in the dark as to the fairness of the grouping. There is one important element in the survey, which it is now the fashion to omit all reference to in settlement reports, viz., the standards and method of valuation. In his report on the revision of the Kotri Taluka, the settlement officer states that those now in force differ considerably from those of 11 years ago; but he does not describe his existing scale. His Excellency in Council is always glad to allow considerable latitude and discretion to settlement officers in matters of this kind; but they must report all they do, and why they have done it, for the information of Government.

17. The last question of general importance which has been brought forward, is the length of the period for which the settlements should be sanctioned. Sir William Merewether is of opinion that a period of 10 years is not sufficient to induce zemindars to collect and lay out capital, and benefit by the judicious investment of it. His Excellency in Council is, however, of opinion that the settlements which are now being made or revised, ought to be only for 10 years, which is the period proposed for the talukas of Sakkar and Kotri. Taking into consideration the transition state of matters in the province, in which considerable development of resources may be confidently expected within the next 10 years, coupled, perhaps, with the closing of old and the opening of new markets, in consequence of the construction of the Indus Valley Railway, and the improvement of existing as well as the construction of new canals; and bearing in mind what has been recorded about the insolvency of large holders and the necessity for assisting them, his Excellency in Council is of opinion that the safest policy will be to lay down the general rule that the revised settlements in Sind shall not be guaranteed for more than 10 years, and to direct accordingly that all revision reports be framed with that view.

18. His Excellency in Council will review separately the detailed proposals which have been submitted for the four talukas of Guni, Kotri, Sakkar, and Baga-ka-Tanda.

(signed) *E. W. Ravenscroft,*
Acting Chief Secretary to Government.

To The Commissioner in Sind,
The Survey and Settlement Commissioner, N. D.,
The Settlement Officer in Sind,
The Public Works Department of the Secretariat (Irrigation Branch).

Appendix, No. 10.

PAPER handed in by Sir *W. Muir*, and referred to in his Evidence of 4th July.

EXTRACT from REPORT on the FAMINE of 1860-61, in the North West Provinces of *India*, by Colonel *R. Baird Smith*; dated 14 August 1861. Appendix, No. 10.

REVIEWING the whole period under notice, we find that in the course of the 91 years that have passed between 1770 and 1861, there have been six droughts variable in the extent of the areas they have influenced, and in their destructiveness of life and property, but all of most serious importance in their effects on the resources of the Government and the material condition of the people. The average period at which they have recurred is about 15 years, but the coincidence of the actual and average periods is only very roughly approximate, the former ranging from 13 to 23 years. The last of the series shows the longest interval of all, and it is an interval so full of significance, and so calculated to throw light on the subject of this section of my Report, that I must try to illustrate it as clearly and explicitly as possible. Before proceeding to do so, I need only add, that I have been given to understand that the same rough periodicity in the recurrence of droughts which has been referred to here, has been noticed also in Australia and South America, where they seem to follow each other at average intervals of nine or ten years, and to be occasionally of extreme intensity.

That period of climatic disturbance which reached its maximum in the drought and famine of 1837-38, was coincident in point of time with the most vital administrative act which ever influenced the material condition of native society in the Upper Provinces. From the time of our earliest acquisition of any part of these provinces up to 1833, our fiscal system, notwithstanding some improvements on the native methods which were gradually introduced, had been thoroughly bad. The assessments were excessive, unequal, and unintelligent. Fixity of demand was virtually unknown, and, with exception to a small part of Benares, no settlements exceeded five years in duration, while a few were annual and many triennial. The collectors were, as a rule, utterly ignorant of the forms of tenure, and of the complex system of individual rights which was in lively action around them. "Seated in his office at the principal station," says a most competent authority,* "the Collector was attended by his right-hand men, the district accountants, by whom he was almost entirely guided. As each estate came up in succession, the court record of previous settlements was read, and the fiscal register for ten years immediately preceding the cession was inspected. The decision of the proprietary rights in the village rested almost exclusively on the dicta of the district accountants, and as these were followed by little farther inquiry, it may be imagined that great injustice was thus perpetrated. Then followed the determination of the amount of the revenue. On this point, too, reliance was chiefly placed on the mere estimate of the native accountants, checked by the amounts of past collections, and by any other offers of mere farming speculators which might happen to be put forward at the time. Mistakes of course occurred, and re-adjustments had to be made even during the currency of the short leases then granted. Great discontent was naturally created by these blind and summary proceedings among those whose interests had been neglected or over-ridden by them."

Growing stability under a Government of power such as ours was, gave, however, a growing value to all rights of property, and it began to dawn more and more clearly on men's minds that they were robbed not only of empty ancestral claims, but of substantial and transferable rights, which were becoming more and more easily transmutable into money as the memories of unsettled times became obscured by the general tranquillity. The earlier forms of redress open to them were worse than useless. Complainants were referred to the Civil Courts, and, whatever may be the condition of these Courts now, they work as in the bright light of day in comparison with the obscurity through which, during the first 15 or 20 years after the cession of these provinces, they had to grope their way to decisions. No record of rights existed; no knowledge of prevailing tenures was available for their guidance; no standards of reference possessing any authority that commanded respect could be made use of. As the authority already quoted truly says, "they could only make confusion worse confounded, and not only were the errors of the Revenue Department

* Settlement of the North Western Provinces, "Calcutta Review," Vol. XII.

Appendix, No. 10.

Department too often confirmed and repeated in the Courts, but decrees were constantly passed so irreconcilable with truth and justice that it was absolutely impossible to execute them."

So frightful at length became the confusion induced by these causes in the state of landed property, that remedies, whose very violence is a measure of the height to which the evil to be abated had risen, were of necessity adopted. A judicial dictatorship was established in 1821, and all public and private transfers of land made within the first seven or eight years after the cession were subjected to its decision. The expedient had but limited success, though the action of the Commission was vigorous enough. It illustrates their course in one of the districts which subsequently suffered most from the famine, to mention that in Cawnpore they annulled 185 sales of land for arrears of public revenue out of 405 of which they took cognizance, or about 45 per cent. of the entire number.

Out of these various efforts, however, there rose gradually a clearer and more practical perception of the true remedies for the deplorable condition of the country. It began to be seen that to assess with equity knowledge was the first necessity, and that as long as brief settlements continued to be made without intimate and accurate knowledge of all the main elements affecting the actual condition of the people, so long must blunders of the most pernicious influence be perpetuated. In Mr. Holt Mackenzie's well-known Act VII. of 1822 these views found clear and explicit expression. The general principles of a sound settlement, the objects to be aimed at, the manner in which they should be sought, with other essential points, are to be traced in it with unmistakeable distinctness. There has always been a genial and generous appreciation in the North Western Provinces of the general wisdom and justice of this scheme, and of the steady growth of accurate information as to the state of the people to which it was the first important step.

But from inherent practical defects in the modes of procedure prescribed, and in certain other points, the plan failed in producing satisfactory results. Ten years after its initiation the progress made in settlements was but nominal. The old record of the Futtehghur district, to which I have previously referred, shows that between 1822 and 1833 only 276 out of 1,164 villages in that district had been assessed under the provisions of the Act. In Futteypore the results were still more notable, only three villages having been settled between 1822 and 1833, and it was generally estimated that something like a century must pass before the whole of the Provinces could be finally settled.

This was, of course, equivalent to a sentence of condemnation on the score of impracticability, and if the plan had been persisted in, the famine of 1860-61 would have found us with fully three-fourths of the work still to do. Act IX. of 1833, however, transformed an unworkable into a perfectly workable scheme, by correcting its errors, simplifying its processes, limiting its range, and supplying for it a comparatively new and special native agency, highly paid and honourably placed, from which much invaluable aid was obtained. In about nine years from the passing of the Act, the whole of the districts * * * were settled for periods ranging from 20 to 30 years.

It forms, of course, no part of my present purpose to dwell on any details of the settlements thus made. For the moment, I desire rather to draw attention to the actual condition of the people as influenced by the state of things which the system of 1833 was designed to ameliorate, than to the effects of that system as developed in after years. It is with this object that I have given the foregoing condensed sketch of the effects of the temporary or summary settlement system which had prevailed without any material mitigation of its depressing and weakening influences up to the time when native society had to endure the terrible shock of the drought and famine of 1837-38. To my own mind I confess it appears clear that no misapprehension can be greater than to suppose that the settlement of the public demand on the land is only lightly, or, as some say, not at all, connected with the occurrence of famines. It lies, in reality, far nearer to the root of the matter, because of its intimate and vital relation to the every-day life of the people, and to their growth towards prosperity or towards degradation, than any such accessories as canals or roads, or the like, important though these unquestionably are. It is no doubt quite true that not the best settlement system which mortal intellect could devise would cover the skies with clouds, or moisten the earth with rain, when the course of nature had established a drought. But, given the drought and its consequences, the capacity of the people to resist their destructive influence is in direct proportion (I would almost say geometrical proportion) to the perfection of the settlement system under which they are living and growing. That system in the North-Western Provinces, prior to 1837-38, was by universal consent a most unsound one, and its direct tendency was to aggravate the grievous pressure which had then to be borne.

Nor was the weakness in the social fabric thus generated much relieved at that period by any accessory aids from either canals of irrigation or central lines of communication, or by interior roads other than the usual native cart tracks. The great navigable rivers were there, of course; but they were the only lines of easy communication with the Lower, and between many parts of the Upper Provinces. The Grand Trunk Road was in its infancy, conceived in plan and in part executed, but only in a very imperfect state. The District roads now existing are the results of a special appropriation which formed part of the new system of settlement, and the miserable expedient of compulsory labour, for which it was the

the substitute, had of course been practically useless. The only canals of irrigation which were then in existence, the two drawn from the River Jumna, irrigated scarcely more than 60,000 or 70,000 acres between them before 1833; and even in 1837-38 their combined effects did not extend over a larger area than about 400,000 acres, which, though locally of the highest value, was yet of but limited influence on the country at large.

Speaking in general terms, therefore, native society in the north-west had to face the calamity of 1837, debilitated by a fiscal system that was oppressive and depressing in its influences; and with its agricultural population generally discontented under the extreme confusion into which, by the action of both revenue and judicial systems, all their most treasured rights had been thrown. In India we all know very well that, when the agricultural class is weak, the weakness of all other sections of the community is the inevitable consequence. Internal trade was burdened and harassed by cumbersome duties, and carried on under difficulties of transport which, in such a crisis, must have been almost paralysing. External commerce had for many years prior to 1833-34, been virtually stagnant; the growth, both of imports and exports, which has now reached such magnificent proportions, had then barely commenced with the removal of the restrictions on the Indian trade in 1833. Reference to the old records of the times shows, that while in 1833-34 the entire export and import trade of the Bengal Presidency, which then included the North Western Provinces and the Delhi territory, was, in even numbers, 7,22,00,000 rupees, or 7,220,000 *l.*; it had been, five years before, or in 1829-30, as high as 7,72,00,000 rupees, or 7,720,000 *l.* The intermediate fluctuations, however, are just such as to indicate, as I said before, a state of trade virtually stagnant. In 1836-37, when the famine was beginning to tell on the country, the upward movement of the trade had begun, and in that year the aggregate imports and exports were 11,12,00,000 rupees, or 11,120,000 *l.*, being an increase of nearly four millions sterling over those of the period ending in 1833-34. Of this increase, perhaps about a million sterling would fairly represent the share of the North-Western Provinces. We know that now this trade, which is among the most vivid and certain indications of internal growth, has risen to above threefold its amount in 1837. Making, therefore, every reasonable allowance for the intermediate increase of population, the conclusion seems still irresistible, that the material condition of all affected by external commerce must have been much lower during the famine of 1837-38 than during that of 1860-61.

These details will, I trust, suffice to give at least a fairly accurate impression of the general condition of the people when the calamity of 1837-38 was imminent. I would now try to give a like impression of the true magnitude and intensity of the calamity itself, as a necessary preliminary to a comparison of its effects with those of the existing famine; and to this end it is primarily necessary to endeavour to define the geographical limits within which the influence of the drought of 1837 was felt.

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In Chart No. VIII. will be found a representation of the boundaries of the famine tract of 1837-38. The area of the greatest intensity was unquestionably on this occasion in the districts of the Lower Doab. North of Allyghur the pressure, though sensibly felt, did not approach to anything like famine, and was far inferior to that in the southern section of the tract. The districts of Agra, Muttra, Etawah, Mynpoorie, Futtehghur, and Cawnpore, were the seats of the extremest misery, and the most pitiable mortality. In Futteypore the suffering was great, and in Allahabad considerable but mitigated. Below Allahabad the pressure was but little, if at all, felt. Oude generally escaped, and is represented as having furnished some surplus supplies to the districts west of the Ganges. The Northern Doab, including the districts of Bolundshuhur, Meerut, Muzuffurnuggur, and Saharanpore, were then exporting districts, and sent such surplus produce as they had by the river routes, or by the ordinary native roads to the southward. On this point all the testimony of grain merchants from whom I sought information was uniform. Rohilkund suffered severely in parts, but not generally. Then, as now, however, some of the districts on the right bank of the Jumna were cruelly devastated. The worst suffering was in Humeerpore, Agra, and Muttra west of the Jumna, and Delhi. There was also a good deal of pressure in Goorgaon, Paneeput, Rohtuk, Hansi, and Hissar; and of these districts Hissar was the worst.

As an index of the contemporary estimate of the comparative intensity of suffering throughout the famine tract, I annex the accompanying list of remittances to the different districts, made by the Calcutta Relief Committee:—

	Rupees.		*Rupees.*
To Agra	27,000	To Banda	8,000
To Cawnpore	19,000	To Allyghur	6,000
To Etawah	19,000	To Delhi	4,000
To Muttra	18,000	To Futteypore	4,000
To Mynpoorie	16,000	To Bolundshuhur	2,000
To Humeerpore and Calpee	13,000	To Kurnaul	2,000
To Futtehghur	8,000		

The committee says, briefly, "the famine appears to have been most grievous in the districts lying along both banks of the Jumna, Muttra, Agra, Etawah, and Humeerpore. The whole district of Mynpoorie, and some subdivisions (Pergunnahs) of Cawnpore were equally afflicted. Futtehghur and Allyghur suffered also, but in the latter district the

Appendix, No. 10.

consequent distress appears to have been comparatively small." To other parts of the tract no allusions are made.

In further illustration of the same point, I give the following Table of the annual revenue of the different divisions of the North-Western Provinces, thrown into averages for quinquennial periods, and extending from 10 years prior to the famine to 10 years after it:

Divisions.	From 1827-28 to 1831-32.	From 1832-33 to 1836-37.	From 1837-38 to 1841-42.	From 1842-43 to 1846-47.
	Rs.	*Rs.*	*Rs.*	*Rs.*
Meerut - - - -	52,28,807	56,54,624	63,81,540	69,05,136
Rohilkund - - - -	64,12,554	58,58,664	55,18,641	63,53,941
Agra - - - - -	70,56,480	75,01,686	62,55,285	70,34,606
Allahabad - - - -	91,63,217	87,87,969	75,16,670	84,00,698
Benares (Goruckpore and Azimghur only) - - -	17,92,438	24,43,719	29,95,416	34,99,065
Delhi - - - - -	- - -	27,86,912	32,70,727	—

From a study of this Table some clear inferences may be drawn as to the comparative intensity of the general pressure. It is well known that remissions of the Government demand, especially under prolonged settlements of the revenue, are made only in cases of urgent and pressing necessity. Average pressure is presumed to be provided against in terms of the settlement, and district officers act under a heavy sense of personal responsibility when they propose large remissions. They now act generally with an intimate, and, probably, in 1837–38 they also acted with a fair knowledge of the real condition of their people, so that the amount of remission of public demand proposed for each district, and the loss of revenue consequent thereon, may be taken as an approximate test of the intensity of the local pressure. So estimated, the Agra division, including the districts of Agra, Muttra, Etawah, Mynpoorie, and Futtehghur, exhibits results surpassing those of any other division. The average annual revenue of the division prior to the famine was, in round numbers, 75,02,000 rupees, or nearly 750,000 *l.* In the five years following the famine it fell to 62,55,000 rupees, or 625,500 *l.*, thus showing an annual loss of 12,47,000 rupees, or 124,700 *l.*, or a total loss in five years of 62,35,000 rupees, or 623,500 *l.* Further, however, the lapse of five years by no means obliterated the influence of the famine on the revenue of the State. In the following five years the average annual revenue was still nearly 5,00,000 rupees below the standard prior to the famine, and in those years a further loss of nearly 25 lakhs, or 250,000 *l.* took place. At this present time the revenue continues to show a difference from the above standard of about 3½ lakhs, so that about 45,50,000 rupees, or 455,000 *l.* must be added for the loss in the 13 years intervening between 1846–47 and 1859–60. The stamp of this terrible calamity has, therefore, remained uneffaced in this division by the lapse of 22 years, and the State has received from the districts forming it less revenue, by an aggregate amount of the almost incredible sum of 1,32,85,000 rupees, or 1,328,500 *l.*, than it would have done had it been possible by any expedients to have warded off the catastrophe. The above, it should be noticed, somewhat underrates the loss, inasmuch as credit is given for increase of revenue due to resumptions of rent-free lands, lapses of estates, and the various miscellaneous items which in the course of 22 years have swollen the apparent land revenue. It also somewhat overrates it from not taking account of reductions of demand due to other causes than the famine, so that on the whole it is probably not far wrong. It is well that in dealing with measures to remedy calamities so disastrous, some definite conceptions should be formed of the vast interests involved, and few illustrations could be more impressive than this, which shows that within a single division, agricultural property certainly not less than from 8 to 10½ millions sterling in gross value was entirely annihilated.

Nearly equal in order of intensity stands the Allahabad division, including the districts of Allahabad, Futtehpore, Cawnpore, Humeerpore, and Banda. Here the loss in the first five years following the famine was 12,70,000 rupees, or 127,000 *l.* annually, or, in all, 63,50,000 rupees, or 635,000 *l.* In the succeeding five years, however, the loss was sensibly less than in the Agra division, being 3,88,000 rupees, or 38,800 *l.* per annum, or, in all, 19,40,000 rupees, or 194,000 *l.* The division has not yet completely recovered itself, and its revenue is still about 2,00,000 rupees, or 20,000 *l.* per annum, below the standard previous to the famine. The whole loss of revenue in this division may therefore be computed at 1,08,90,000 rupees, or 1,089,000 *l.*, representing a destruction of agricultural property which may be valued at from six to eight millions sterling, according to the proportion which the revenue is assumed to bear to the gross produce of the land. Regarding this proportion, opinions differ, but for purposes of calculation I take it to be as one to eight.

Rohilkund shows very moderate traces of suffering, and even these were nearly obliterated within the five years after the famine. The total loss in this division did not exceed

exceed probably about 18,00,000 rupees, or 180,000 *l.*, and one million sterling may be taken to represent the value of produce lost. The revenue in the second period of five years after the famine was about five lakhs per annum above the ante-famine standard, and it has continued rather to rise than fall ever since.

The Meerut division shows not only no signs of permanent suffering, but marked proofs of great and steady progress. In the first five years after the famine its revenue rose to over 7,00,000 rupees, or 70,000 *l.* per annum, and in the next five years to about 12,50,000 rupees above the standard before the famine. It has remained nearly constant ever since. These results fully confirm the belief that in 1837-38 the Meerut division scarcely suffered at all. A trace of pressure in Bolundshuhur and somewhat severer suffering in Allyghur represent the full influence of the famine, and as I find from the records of the Allyghur district that the whole amount of remissions deemed necessary by the collector to mitigate the suffering was only 87,000 rupees, the calamity could evidently have been but lightly felt. Where its intensity was the greatest, the results were very different to this, as the following extract from Mr. H. Rose's Settlement Report of Cawnpore shows :—

"Remissions of Revenue on account of the Famine in Cawnpore."

	Demands.	Collections.	Remissions.
	Rs.	*Rs.*	*Rs.*
1837–38 - - - - -	21,75,858	11,57,219	10,18,639
1838–39 - - - - -	21,77,733	17,36,426	4,41,307
1839–40 - - - - -	21,89,658	19,24,360	2,65,298
Total of Remissions in Three Years - - -			17,25,244

Writing in 1841, Mr. Rose mentions that the breadth of cultivation was still very much less than before the famine, and indeed the revenue is at this time a shade below what it then was. Similarly in the Agra district, the remissions in the first year following the calamity are given at a little over 22,00,000 rupees, or 220,000 *l.*

The Delhi division shows on the whole very slight signs of permanent suffering, and in the Benares division there are none at all.

These details will, I trust, suffice to show that the geographical limits of the famine tract of 1837-38 have been traced with as much care as the means available for the purpose would permit. There are strong indications that within the bad parts of the tract there were degrees of suffering, not in such marked contrast as on the present occasion, but still discernible, and due doubtless in the main to the same causes, the variations in facilities for culture, and in the natural capacity of the different races of the people for agricultural labour. But there is no reason to doubt that the pressure was much more general then than now by reason of the inferior ability of native society to resist it.

The total area of the famine tract of 1837-38 may be estimated roughly at from 20,000 to 25,000 square miles, or from 12 to 16 millions of acres; it does not differ very materially in extent, therefore, from that of 1860-61.

* * * * * * *

Estimating from these various data as well as I can, I would say that the total population affected by the famine of 1837-38 must have been between eight and nine millions. and that the population of the districts within which the intensity of suffering was greatest, and the mortality highest, must have been roughly about five millions. In 1860-61 the corresponding numbers were about 13 and 5 millions; but in reference to the latter number, it will be noted that no such discrimination could be used in distinguishing the various interior areas of greatest intensity in 1837-38 as was practicable in 1860-61.

As regards the comparative intensity of the drought, physically considered, during the two famine periods, I think it may with confidence be taken as virtually the same. There are no records of any value showing the rainfall during the earlier period, when indeed the value of such records in relation to land revenue questions was only beginning to be appreciated. Both droughts, however, were heralded by previous seasons of dryness injurious to agriculture. In 1833-34 there had been a partial famine, but 1834-35 was a year of abundance. 1835-36 was indifferent, and 1836-37 again was good. It is well known that 1858, 1859, and 1860 were very dry and unfavourable. The nature of the drought in each case was the same. An almost entire failure of the rains required for the autumn crop, and the consequent destruction of that crop, was followed by a total failure of the spring rains, so that no land could be cultivated but with the aid of artificial irrigation. When no autumn rains fall after August it matters very little, so far as agriculture is concerned, what the previous falls may have been, and as it was the case that both in 1837-38 and 1860-61 not a shower fell from September till March within the bad parts of either famine tract, the conclusion that the physical intensity of the drought was practically the same in both is a safe and reasonable one, and the broad fact of this identity makes the absence of detailed registers in the earlier period a matter of no serious practical importance.

There is, however, one point, and a vital one, on which the two periods differ very

Appendix, No. 10.

remarkably. That is, in the prices of food-grains during the currency of the famine in each. After a most careful and minute search, I have been able to find no instance during the very heaviest pressure of the famine of 1837–38 in which the price of wheat rose above 11½ seers per rupee. The grain prices are almost invariably quoted without reference to the value of the weights used; but as local grain weights generally somewhat exceed the Government standard, any error would most probably tend to lower the rate a little.

I give some illustrations of the prices in 1837-38 at different places:—

Allahabad	17½	Seers per Rupee.
Cawnpore	13½	„
Allyghur	18	„
Futtighur	11¾	„
Agra	11½ to 13½	„
Muttra	12	„
Kurnal	12 to 14	„

The average price in the worst localities may safely be taken at 12½ seers per rupee. It is well known that in the worst localities of the famine of 1860–61 the price was up to 7½ seers per rupee, and ranged between that and 8½ until the influence of the vast importations in February, March, and April 1861 began to tell on the markets, when it fell to between 10 and 11. Making all needful allowance for such part of this marked difference of prices as may be due to intermediate variations in the value of money, there can be no question, I think, that the presure from dearness of food ought to have been sensibly greater in 1860–61 than in 1837–38. It will not be overlooked either that the mass of the population which had to feed itself at these enhanced rates was much greater in the later than in the earlier period. The general resources available to meet this increased demand must therefore have been proportionally larger.

* * * * * * *

On another point indicative of social condition and material prosperity, the two famine periods under comparison show marked contrast. No sooner had the serious pressure of the famine begun to be felt in 1837-38, than the ordinary bonds of society seemed to be broken by it. Beginning in Rohilkund, the population gathered into bands for plunder, and driven desperate by starvation, they everywhere attacked the grain stores in the larger villages and towns, and carried off their contents. Spreading rapidly, the disorganisation soon reached the districts of the Lower Doab, and deplorable confusion is described as having prevailed from Bareilly to Allahabad. Troops had to be moved out on some occasions, and during the whole course of the famine a largely augmented police force, both of horse and foot, had to be kept up to maintain the peace, a duty which, however, was very difficult to perform against large bodies of men whose natural instinct for fight or plunder was quickened by the sense of their own sufferings, and the sight of those of their wives and children. Of such disorganisation as this we had no signs during the famine of 1860–61, and though this may in part have been due to the influence of military operations too recent to have lost their moral effect, yet I believe it was much more due to the far healthier condition of native society now than then.

It is not my intention to reproduce here the harrowing, and in many instances most revolting illustrations of the greater and more terrible mortality of the earlier famine which have come under my notice in collecting materials for this comparative view of the two periods. From every large station the testimony is the same, and the witnesses are so varied, and of condition so unimpeachable, that making every allowance for the excitement of the time, it is impossible to doubt the general fidelity of the sad pictures they present. The impression given is, in truth, that the calamity was of such intensity and magnitude as to have been really unmanageable. While, for example, the daily burials by the police at Agra are reported to average nearly 400, numerous observers draw attention to the profusion of bodies near the river, and along the roads. I annex below a general order, which gives a painful stamp of reality to like descriptions from Cawnpore, and in the Appendix will be found details from Futtighur, confirming the same mournful conclusions. The official reports of settlement officers abound with references to the devastation and waste of life of which they had incontestable proofs in the course of their duties in the interiors of districts. Of Etawah, Mr. Martin Gubbins writes, in 1841: "That the population has been very sensibly reduced by death is abundantly evident from the still deserted houses and abandoned lands, as well as from the general fall of rents throughout the district. This latter fact sufficiently indicates the competition, not of cultivators of land, but of landholders for cultivators, and it will, no doubt, require the lapse of many years to replace the population that has been swept away." Of the other bad districts, like evidence might be produced, but it is needless to give more than samples of such results. The general mortality, cannot, of course, be known now, with any approach to precision, but I doubt if it were less throughout the entire famine tract than about 800,000. The poorer landholders who, in 1860–61, were just able to struggle through the time of greatest need, suffered in 1837-38 as bitterly as did the mere labourers and artizans now. Large numbers of them died of starvation, and I find it specially noted that among the 80,000 paupers employed or supported by the magistrate of Agra, a very large proportion was of small proprietors. This was the natural result of their social condition at the time, as before described. Their land was utterly valueless unless they could cultivate it; it had no market price,

price, for no man would buy it, or make advances upon it as security, so that their only resource was to become paupers, or perish.

Contrasted from these different points of view, the general conclusion regarding the two famine periods is, that as in all the material conditions by which intensity of suffering is decided, 1860-61 was fully equal to 1837-38, while in some of the most important, as price of food and mass of population, for example, the latter was decidedly in a worse position than the earlier period, the actual sufferings of the community ought to have been greater now than then. Yet we know that this was very far from being the case, whether that intensity be measured by the sacrifices entailed on the State, or by proofs of misery visible among the people. Neither will revenue have to be abandoned now to an extent at all comparable with what was needful then; nor has society become disorganised; nor have the people died in any such terrible proportions; nor will the influences of the suffering, mournful though in many instances it has been, continue so long; nor has the great body of the humbler proprietaries collapsed under the greater pressure; and these results lead directly to the more close consideration of the causes to which differences so marked are to be attributed. No part of the subject will guide us more immediately, I believe, to sound remedial measures than this.

Foremost, then, among the means whereby society in Northern India has been so strengthened as thus to resist with far less suffering, far heavier pressure, from drought and famine in 1860-61 than in 1837-38, I place the creation, as it may almost literally be called, of a vast mass of readily convertible and easily transferable agricultural property, as the direct result of the limitation for long terms of the Government demand on the land, and the careful record of individual rights accompanying it, which have been in full and active operation since the existing settlements were made. I have before described the condition of agricultural property antecedent to these settlements, and it will probably be admitted, without serious qualification, that a state of things more likely to weaken the society living under it could scarcely be conceived. To the great and unequal pressure of public burdens, to the hopeless confusion or ambiguities of title, to the frequent and arbitrary interferences then prevailing, have succeeded assessments rarely heavy, generally moderate, and in many instances extremely light; titles minutely recorded and easily understood, long leases, and the guarantee of the enjoyment of all profits during the currency of such leases. The natural results of such a change in so vital a part of the social economy have grown steadily more and more apparent. Land has obtained an increasing marketable value. Its value as a security has doubtless been largely made use of in mitigating the pressure of the famine. Beneath the surface there is continual change of proprietorship in progress. Sales of land for arrears of public revenue have almost disappeared from the public records, while sales by voluntary action or in satisfaction of debts have vastly increased. These mutations almost uniformly indicate the healthy gravitation of capital to the land, and though some may mourn over the gradual but certain displacement of an ancient proprietary with all its traditional memories, the revolution will advance just as surely as in the struggle of life, industry, thrift, intelligence, and wealth must displace indolence, extravagance, intellectual stagnation, and poverty. The general tendency of local influence is to check this process, but the effort is idle, and may be mischievous. The action itself is, in so far as the stability of society is concerned, matter for congratulation rather than matter for regret, and it is determined by natural causes which can no more be interfered with arbitrarily without damage, than can the natural laws regulating trade in any other forms. Whether we will it or no, however, the gradual growth of monied classes, and the progressive tendency of such classes to seek investments in land, are sure to bring the soil and the capital of the country more and more closely into an union, to be fruitful ultimately in the most beneficial results to all.

To show the stagnation before, and the growth subsequent to the existing settlements, I give the annexed statement of the price of land at different periods in the district of Bareilly. I take this district as an illustration, because no records of any other I have been able to procure cover so many years.

Decennial Average Selling Price of Land Sold by Private Sale in Bareilly.

YEAR.	On Total Area per Acre.	On Revenue Paying Land per Acre.	On Land actually Cultivated per Acre.
	Rs. a. p.	*Rs. a. p.*	*Rs. a. p*
1823 - - - -	2 12 11	3 1 3½	4 6 6
1833 - - - -	2 10 2	3 8 9	4 6 2
1843 - - - -	5 5 6	6 4 1	7 10 8

It appears, therefore, that in 1823 land sold for *Rs.* 4. 6. 6., or about 8 *s.* 9¾ *d.* per acre of cultivated soil. Ten years later it sold for a shade less, but in 1843 the selling price had risen to *Rs.* 7. 10. 8., or to about 15 *s.* 3 *d.* per acre, being an increase of little under 75 per cent., and now it is about twice this rate. The best revenue authorities agree in estimating the average selling price over the North-Western Provinces in 1837 at one year's

Appendix, No. 10.

rent, or about one and a-third times the amount of the Government demand on the total area sold. It had risen in 1848, as determined by very extensive data, to three and a half times the revenue; and now it may safely be taken at about five times that standard. The total amount of the land revenue in 1837-38 in those parts of the North-Western Provinces and Delhi territory under long settlements was, in round numbers, three-and-a-half millions sterling. The average value of the land was therefore somewhat more than four and a half millions. In the 24 years that have since passed, this value has risen to five times the amount of the public demand at the earlier date, or to 17½ millions, having thus increased the wealth of the landholders by the great sum of nearly 13 millions sterling. Under the administrative improvements of the period this wealth had ceased to be locked up and untransferred; and it can, I think, admit of no question that society so strengthened must have been competent to bear much heavier strains than it could bear before.

Such, then, having been the general results of the protracted fixity of the public demand, the security of titles, the general moderation of assessment, the recognition and careful record of rights, and the reasonably equable distribution of the burden of land taxation, which were the main characteristics of the settlements of 1833–45, the inference seems irresistible, that to intensify and perpetuate those results we must proceed still further in the same healthy and fruitful direction. The good which has been done by partial action on sound principles is both a justification and an encouragement to further advances, and entertaining the most earnest conviction that state interests and popular interests will be alike strengthened in an increasing ratio by the step. The first, and, as I believe, most important remedial measure I have respectfully to submit for consideration, is the expediency of fixing for ever the public demand on the land, and thus converting the existing settlements in the first great subdivisional section of the tract of country now under reference, from settlements for long periods only into settlements for perpetuity.

* * * * * * * *

So far back as 1802–3, the pledge of a perpetual settlement of the land revenue was given by the local authorities to the people of these provinces, subject, however, to the sanction of the court of directors. In describing the fiscal system of that period, and the state of general misery and oppression which had prevailed, Sir Robert Montgomery thus alludes to the temper and feelings of the people:—

"I have quoted enough to show the state of the country then about to be subjected to British management.

"The first step was a false one. The revenue (of the district of Cawnpore) was raised from 22,56,156 rupees to 24,87,924 rupees. * * * * The people, however, were full of confidence in the justice and integrity of the British Government, and looking forward to the blessings of a perpetual settlement, such as had been formed in Bengal, were ready to accede to any terms."

Such a settlement was negatived, however, at the time by the home authorities, and looking back from the vantage ground of the long intervening experience, it appears clear that, if made in the dense ignorance which then prevailed, it must have involved, unconsciously to its authors, a hideous amount of injustice and wrong. More than a quarter of a century was allowed to pass, however, before even a moderate degree of light was let in upon the various bearings of the question; and even now, at the end of more than half a century, many will still doubt whether we can safely grant to the people those blessings which were anxiously expected by their fathers, when the country first came under British rule. I believe, however, that the boon of a public demand, fixed for ever, would be appreciated at this time even more heartily, because far more universally, than at that remote period; for thousands would share, each in his degree, in its benefits now, by reason of the general recognition and record of individual rights, for tens who would have shared then.

It may be supposed that a great sacrifice of public revenue is involved in the concession of a perpetually fixed demand on the part of Government. It is to be observed, however, that (with a single exception to be noticed separately) the recent tendency of the measures of Government has shown a different conviction, and indicated a belief that its interests are best secured, not by general enhancement, but by general lightening of its demand on the land. The latest orders under which settlements now in progress are conducted prescribe a reduction of the proportion of the rent or net produce hitherto appropriated as Government revenue from 66 to 50 per cent.; and I have no doubt that this is a most wise and prudent step, sure to justify itself before many years pass away. It is scarcely possible, indeed, that a tax on rent, which, even at its minimum absorbs half that product, and presses exclusively on a single section of the community, can be permitted to increase. The tendency will, I believe, be quite in the opposite direction; and instead of desiring to raise the moderately assessed districts to the level of the highest, the best revenue authorities will probably seek to lighten the pressure on the latter; and in this manner, rather than by the converse process, to equalise the burden generally. Such an equalisation would lead to an universal increase in the wealth of the agricultural classes. The price of land would rise gradually from four or five years' purchase of the Government revenue to 10 or 12 times that standard. Capital would in time accumulate in other hands than those of the native money-dealers, or the scarcely taxed native commercial classes in general. The land would enjoy the benefit of such accumulations, and as a necessary consequence of the increased prosperity of that class, which must always be the very core of native society, and with the

the strength or the weakness of which the social fabric generally must always have the acutest sympathy, trade and commerce and general wealth would not only increase, but, as years passed on, the community must grow stronger and stronger, and the risk of its collapsing under any such calamities as that we are now considering, would gradually become less and less. Assuming, then, that the results of the measure would, in some degree at any rate, realise these anticipations, it seems unreasonable to suppose that an intelligent and powerful Government could fail to participate in them. Its intelligence would direct it to the least offensive and most effective means of sharing in the general prosperity, and its power would insure the fair trial and ultimate success of those means. There would be no real sacrifice, therefore, I believe, but, on the contrary, a marked increase of the public resources, from the creation of the increased private prosperity to which it is conceived that a perpetual settlement of the public demand must lead.

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It will be understood, then, that in advocating a perpetual settlement of the public demand on the land as a means of strength and growth to the community in the famine tracts, I contemplate no interference whatever with existing rights in the soil. * * * * * * * * The steady gravitation of capital to the land, of which the evidences are already unquestionable; the tendency to aggregation rather than to minute subdivision of the soil, of which proofs are discernible; the growth of wealthy communities, such as I have indicated in speaking of the influences of canal irrigation, with many other points, all indicate the direction in which society is moving; and I am sure that, such being the case, the safest and best policy as regards its internal action is simply to leave it alone, and let it assume its natural forms and conditions, with the smallest amount of external interference that is consistent with good and efficient administration. Sudden or magical strides in improvement are neither expected from fixity of demand, nor are they possible. But that the principle is sound and its action satisfactory have been proved by 30 years of trial. The time for the next step in advance is, therefore, now believed to have arrived, and what is expected from its adoption is only an acceleration of that growth and progress of which I believe I have given sufficient proof, and a steady though more rapid strengthening of the community in its most vital relations to resist such calamities as have lately swept over it, and must be expected to sweep over it again.

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With these improvements introduced, the strengthening action of the fiscal system will have received the largest development which it is capable of receiving from the hands of Government. It will remain for the community to take full advantage of them, and, judging of the future by the past, I do not think there is any reason to be doubtful on this point. Should another drought have to be borne some 20 years hence, the justification of the principles now advocated will be as plainly stamped on the social fabric then, as I believe that of the principles established in 1833 is stamped upon it now.

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Appendix, No. 11.

PAPER handed in by Sir *W. Muir.*

Appendix, No. 11.

I.—BHABUR CANALS, NORTH WEST PROVINCES.

From Secretary, to the Government, North West Provinces, in the Public Works Department, Irrigation Branch, to the Secretary to the Governmeent of India, Public Works Department, dated Nynee Tal, the 6th October 1871.

In continuation of my letter No. 1009, dated 4th April, I am desired by His Honour the Lieutenant Governor to submit, for the information of His Excellency the Governor General in Council, documents illustrating the progress which has been made in the irrigation and general improvement of the Chilkea Estate in the Kumaon Bhabur.

In the enclosed report, Colonel Ramsay records the use to which he has turned the sum of a lakh of rupees granted to him in 1868-69, as an advance, for the irrigation of these lands, to be repaid by annual instalments from profits; and relates the general result of the irrigation works constructed in this tract, since 1860-61, when Colonel Ramsay received charge of it.

At that time there were only 18 villages, some of them very small settlements, between the Saweldé and the Kossee Rivers; no satisfactory irrigation arrangements then existed. There were three or four water-courses under no general control, from which the villagers took off water after the rains in any way they could; but until permanent head-works were established on the right bank of the Kossee, the channels were useless in the rains, and the valuable rice crops now obtained could not be grown.

Expending his surplus revenue, year by year, Colonel Ramsay has extended his settlement until now,—109 villages are planted in the tract, 10 miles by 4, which is irrigated between the Saweldé and the Kossee. They pay for land and water revenue a yearly amount of 33,705 rupees, which is annually increasing. The expenditure on irrigation within this period has amounted to 1,53,465 rupees.

The irrigation of the Bhabur shows greater results, perhaps, than are exhibited in any other tract of these Provinces; for irrigation there creates life, and permits of settlement and cultivation which would otherwise be impossible. It creates revenue too, and, allowing half proceeds to be for land and half for water, the gross irrigation revenue amounts to 10 per cent. on outlay.

At the same time it is to be observed, this irrigation is practised under very favourable circumstances. There is plenty of water; the length and capacity of water-courses are small, there are no large and critical works upon them, and they begin to work from their very head. The revenue and irrigation management is under one hand, so that all theresources of the country are available in the construction of the works, and the irrigation officer can always rely on the cordial support of the revenue authorities.

These advantages Colonel Ramsay has known full well how to turn to account, and, by skilfully adapting his means to his ends, has overcome, with infinite energy, patience, and fertility of resource, the very serious difficulties which beset the enterprise of colonising the Bhabur.

The works and lines of channel constructed with the lakh of rupees advanced in 1869, are shown in the accompanying map, and specified in the enclosed list; an account has already been furnished to the Accounts Department.

The first instalment of the advance has been punctually repaid, and Colonel Ramsay anticipates

anticipates no difficulty in accomplishing the entire payment on the terms and within the limits prescribed. Appendix, No. 11.

ABSTRACT.

			Rs.	a.	p.	Rs.	a.	p.
No. 1	Cost of	Kanya Canal, 4 miles - - -	43,974	12	1			
„ 2	„	Mujharee Canal, 4 miles - - -	38,607	–	8			
„ 3	„	Six mills on Kanya Canal Line - -	4,048	4	1			
„ 4	„	Two mills on Mujharee Canal Line -	1,531	1	1			
„ 5	„	Saweldé Mill and Canal - - -	1,303	4	1			
„ 6	„	Belgur Head-work and Canal, East Bank of Roree - - - -	5,941	15	–			
„ 7	„	Dalika Head-work - - - -	1,223	12	10			
„ 8	„	Miscellaneous - - - - -	3,369	14	2			
						100,000	–	–
		TOTAL Expenditure on all Canals - -	Rs.			100,000	–	–

From *H. Ramsay*, Esq., Commissioner of the Kumaon Division, to the Joint Secretary to the Government, North West Provinces, Public Works Department, Irrigation Branch. No. 319—384, dated Nynee Tal, the 7th September 1871.

IN continuation of my letter No. 83, dated the 10th April last, I have now the honour to submit a roughly-prepared map showing the irrigation masonry channels on the right bank of the Kosee river, on which about 90,000 rupees were expended during the cold weather of 1869-70. The balance of the tuccavee advance of one lakh, nearly 10,000 rupees, was expended as per margin; but I have been unable, from want of funds, to complete irrigation arrangements in connection with these head-works, therefore I have not sent any map of the country on the east bank of the Kosee, or of that on either side of the Dalika river.

	Rs.	a.	p.
Head-work on east bank of Kosee -	5,941	15	–
Dalika river head-work - -	1,223	12	10
Saweldé Mills - - - -	1,303	4	1
Lime Kilns - - - -	1,391	4	–
TOTAL - -	Rs. 9,860	3	11

I send a tracing prepared from the different survey maps of Captain Vanrenen, showing the tract between the old Kumaon boundary on the east and the Saweldé on the west. A large portion of this on the right bank of the Kosee river belongs to "Jhupa Ganga," a settled estate with which I could not interfere. I also submit an elevation and section of one of the water mills used in the Bhabur, of some of the bridges and culverts, which added considerably to the cost of the work, and cross sections of different portions of the canals made.

When Chilkea was placed under me in 1860, there were no satisfactory irrigation arrangements at all; after the rains the villages took off water in any way they could. One large water-course, called the Nuthee-wala gool, was under the collector of Moradabad. It took water down to some Turai villages below the Bhabour. Another water-course, called the Kanya gool, watered three or four small villages, and a third called the Mujharee gool irrigated Chilkea village, and some small patches of cultivation above and below it. The Nuthee-wala and Kanya gools were rendered useless by the first flood, and Mujharee gool sometimes was closed, at other times it threatened to wash away the country according to the direction of the main stream of the Kosee.

I was authorised to pay the Government demand into the treasury, and expend all I could realise in excess of that, on the improvement of the Chilkea tract. I first made a permanent head-work, which enabled me to keep a constant supply of water in the Nuthee-wala and Kanya gools. I also improved the Mujharee, and marked off a number of villages which could be irrigated from these water-courses, and with the surplus receipts I improved the then existing state of irrigation, as far as possible, erecting mills, as these works progressed to meet the wants of the increasing population.

Since 1860-61, I have expended on irrigation works in the tract shown in the accompanying map, up to the end of 1869-70, the sum of 153,465 rupees, but a good deal of this was expended on temporary arrangements which have now been dispensed with. I had not sufficient funds to undertake any complete scheme of irrigation, and was obliged to make money by increasing cultivation which could only be effected by supplying the means of irrigation. I, therefore, made a great many water-courses, and constructed small masonry works, where absolutely necessary, as far as possible, with a view to their suiting the permanent works now completed, and while the masonry channels were being made, I could not interfere with existing irrigation channels without injury to established villages, therefore, below the head-work I was generally obliged to adopt a new line. Many of the old channels thus became useless, and cannot now be considered as part of the present canals, thus the permanent irrigation works cannot be said to have cost 1,53,465 rupees, although that sum has been actually expended in supplying the means of irrigation from first to last. You had an opportunity of examining the most expensive part of these works in March 1870, and I am happy to state that they have stood the test of two seasons of unusually heavy rain

Appendix, No. 11.

without suffering at all, and the whole of the works on the west bank of the Kosee river have been a complete success.

There were 18 villages, some of them very small settlements, in existence when this tract was placed under my charge. There are now 109 villages, and the revenue realised from land and mill-rents in the year ending 30th September 1870 was 33,705 rupees. As cultivation progresses the returns will increase. The Government demand on account of the tract under direct management is 2,824 rupees.

The greater part of the soil between the Kosee and Saweldé rivers is very sandy, and the loss of water from absorption was so great that, without masonry channels, I saw it was impossible to increase the cultivation of any great extent, because the river became very low in March when water was most urgently required.

By arrangements now made, I can irrigate the whole of the tract between the Kosee and the Saweldé rivers. The Kanya masonry channel is 4¼ miles in length. It feeds the Nutheewala gool by an off-shoot which can turn four mills. Up to this point it is 15 feet wide, and beyond it is only 8 feet wide, till it sends off another stream of water, when it is reduced to 4 feet, which is sufficient for the number of villages it is required to irrigate. The Chilkea Canal goes down the Kasheepoor road, and irrigates on the east of the line of villages on the Nutheewala gool, while on the east it waters all land up to the Mujharee gool. This channel is close upon five miles long, and works three mills. At Chilkea village, a branch turns off to the west and goes down the Juspoor road. I can supply the Mujharee gool from this channel, at Chilkea, and irrigate all the land on the east bank of that water-course.

By bringing the Mujharee water-course under command, any quantity of water can now be sent down by it in the rains when the villages use such a quantity of water for rice, while the masonry channel contains an abundant supply for the land west of the Mujharee gool.

Considerable progress has already been made on the east bank of the Kosee, and of the Dalika by making temporary arrangements; but until I can secure a permanent supply of water in the rains, I do not expect to make much way. I hope during the ensuing cold weather to connect the head-work on the left bank of the Kosee with the high land, from which water can be sent in any direction between the Kosee and Dalika. In the same way I shall try to make the Dalika head-work give a constant supply during the rains, by passing the water under some ravines, and getting it on to high land beyond the reach of the Dalika river, which last year changed its course and turned away much to the east.

Most of the villages shown in the map below Chilkea, are newly settled. Each village has a small supply of water constantly running. This is regulated by a small gate made of sheet-iron, which is raised or lowered according to the extent of cultivation, and fixed by a padlock, for which the village is responsible. In the rains the gates are opened altogether, as the supply of water is abundant.

I cannot say correctly what number of cultivated beegahs there are in the Chilkea Ilaka, as the new villages in the lower part have not been measured or assessed; but there is no doubt I shall be able to pay up the instalments specified in my letter No. 9C, dated 27th March 1870, as per margin, and I have alread paid the first instalment of 10,000 rupees, with 5,000 rupees interest.

					Rs.
Before the 31st March		1871,	with	interest	10,000
Ditto	ditto	1872	ditto		20,000
Ditto	ditto	1873	ditto		20,000
Ditto	ditto	1874	ditto		25,000
Ditto	ditto	1875	ditto		25,000
TOTAL					*Rs.* 100,000

In putting down new villages, I allow the cultivators to have the land free for two years; the third year, the cultivation is assessed at four annas a kutcha beegah,* and it increases one anna every year until it reaches eight annas a beegah.

*6. an acre, *Rs.* 1. 8 *a.*

II.—BURMDEO CANAL.

From Major General the Honourable Sir *H. Ramsay*, C.B., C.K.S.I., Commissioner Kumaun Division, to Secretary to Government, North West Provinces; dated Almora, the 6th October 1875.

I HAVE now the honour to submit, for the information of his Honour the Lieutenant Governor, a report on the Burmdeo Canal, which was commenced in 1871. Yearly accounts of expenditure, aggregating 2,00,000 rupees, have been submitted in the Irrigation Department.

When General Strachey visited the proposed head-work of the Sarda canal, which was to have irrigated a large portion of Oudh, he passed through part of the Tarai and the Bhábar. He was much pleased with the improvements he saw as the result of irrigation in the Bhábar; and under the impression that the country above the proposed head-work of the Sarda canal, and below Banbassa, would be much more healthy if brought under cultiva-

tion,

tion, it was suggested that a small canal should be taken off at Burmdeo; and under the orders of the Government of India, No. 78, dated 4th March 1871, a takávi advance of two lakhs was sanctioned. This sum has been expended, as shown in the accompanying account.

As soon as the canal from the Kosi river at Ramnagar, for which I had received a takávi advance of a lakh of rupees (which has been repaid), was completed, the Burmdeo canal was commenced, but in consequence of the unhealthiness of the country it was impossible to begin masonry work before the end of December. Workmen would not remain later than April, and contractors could not be kept much after the end of March. In consequence of this, the progress of the year was limited to about four months' work, and even for that time carts were induced to come with difficulty by paying high rates, while we were dependent on them for carriage of lime and stone.

In consequence of these difficulties, it has taken four seasons to accomplish what might easily have been done in two years in the western side of the Kumaun Bhábar.

The Bhábar tract which this canal is intended to irrigate is on the right bank of the Sarda river, and on the east of the Jugbura river below the eastern part of Kumaun known as Káli Kumaun.

The people of Káli Kumaun resort to this Bhábar as those of the more western parganas of the district migrate to Chakáti and Koti Bhábars. A great part of the Káli Kumaun is so bitterly cold in winter that the people with their families and cattle move down and remain in the eastern Bhábar for several months. The people are poorer than in western Kumaun, and very badly off for grain as compared with the pargana of Shore, or other parts of the district. Nothing could induce them to go beyond the tracts to which they had been accustomed; and though they might have cultivated with the advantage of irrigation in the vicinity of the Deoha river at Chorgallia, not one Káli Kumaun man has been induced to settle there as a cultivator.

In years of scarcity the people of Káli Kumaun were in great difficulties, and hundreds died from fever, because they had to go to Pilibhit for grain through a broad belt of very unhealthy country, and to travel 50 miles in the plains at the hottest time of the year, while west of Káli Kumaun the hill-people who were in the same strait for grain supplied their wants by going to the Bhábar villages immediately below the hills, and did not suffer from fever at all.

The difficulty of irrigating a tract of land in the eastern Bhábar, sufficient to supply grain for the Káli Kumaun people in case of scarcity in the hills, was so great that I hesitated to undertake the Burmdeo canal, but the people were so anxious to have cultivation, such as they had seen in the western Bhábar, and the necessity for a canal was so great, that I felt compelled to complete the Bhábar irrigation arrangements, by which the whole of the Kumaun district could be supplied with grain in times of scarcity, without the disastrous consequences of having to travel long distances to the plains during the unhealthy season, and I think this has now been done.

In three or four years there ought to be a great many villages irrigated by the Burmdeo canal, yielding sufficient grain to supply Káli Kamaun in case of scarcity. A certain supply of food in times of drought was the principal object I had in constructing the Burmdeo canal, but I have no doubt it will give a fair return on the outlay, while the cultivation and profits it will yield cannot fail to improve the condition of the Káli Kumaun people.

The advance sanctioned by the Government of India has been received as per margin, and details of expenditure having been rendered yearly, I now only give an abstract of receipts and expenditure, showing how the two lakhs of rupees have been expended. I propose completing the canal from the surplus Bhábar funds this year, and if the eastern Bhábar makes the progress I expect, the whole of the good land will be taken up, and the advance received from the Government will be repaid by the end of 1879.

		Rs.
1872-73	- - - -	50,000
1873-74	- - - -	50,000
1874-75	- - - -	50,000
1875-76	- - - -	50,000
TOTAL	- -	*Rs.* 200,000

In 1872, the head-work only was completed, and the canal line was excavated for about a mile to some extent, but it was found that the floods of the Sarda river extended beyond our calculation, and the canal was filled with sand. The head-work was made between two reefs of pudding stones, or conglomerate, by a cutting in the dry (in cold weather) bed of the river, varying in depth from 7 to 25 feet; the sides of two tubes, having been substantially built, were arched over, and these tubes extended on the river side to the edge of a deep pool in the Sarda river, and on the opposite direction to the high bank beyond the reach of floods, the space above the tubes was filled in with boulders and sand to the height of the natural bed, and the river in the rains goes over it as before. The orifice of the tubes which is closed by double planks with clay between them, keeps the river out in the rains, and by taking out all the planks, four feet of water can be admitted when the river is at its *lowest* level. A gate at the lower end of the tube regulates the quantity to be sent down the canal. During the rains there is sometimes 15 feet of water over the tubes, but three years of experience proves that the work has been a complete success.

I may here mention that during the rains when the gate cannot be opened, any quantity of water can be let into the canal from ravines which cross it below the arched part.

Appendix, No. 11.

At first I do not anticipate that the land will be readily taken up, as cultivation by hillmen in the Bhábar will be a novelty, but by encouragement I feel satisfied the useless jungle between the Sarda and Jugbura rivers may, in a few years, become highly cultivated. The Forest Department have removed most of the timber worth exporting, and when cultivation admits a free circulation of air there is no reason why the country below Burmdeo should not be as healthy as that below Haldwáni. At present no water is procurable in the Eastern Bhábar except from the Sarda river or springs which break out in swampy ground, and the people are obliged to locate themselves, generally speaking, in unhealthy places; when they can live on the high land with stream of good water running through the villages the fear of the climate will disappear, and no doubt rice as well as wheat will be extensively cultivated.

The slope of the country immediately below the head-work is very unfavourable; the rise is so rapid that beyond the reach of the Sarda floods the digging became so deep, it would have been necessary not only to made very wide excavations, but to have protected the sloping sides and constructed expensive works for carrying the surface drainage over the canal. Under these difficulties I determined to arch the canal till it got beyond danger from floods and surface drainage. Preparations were made for this to the extent of one mile, but the cholera interfered with progress; workmen and contractors ran away, and the mortality was so great, while the pestilence lasted nearly two months. Energy (no one could have shown more than Mr. Cumberland, who was in charge) could not overcome the difficulties, and only 35 chains of arching could be completed at different parts, within a mile, where materials had been collected. At the close of the season, these tubes were built up at both ends to keep out silt. During the rains of 1873 an extensive landslip occurred on the hill; this filled up a large water-course which had previously carried the drainage of the hill into the Sarda river, about 300 yards above the head-work; the hill drainage was thrown southwards across the canal, the weight of water knocked in the ends of the arched portions; the consequence was, the tubes that had been built were filled with silt, and the excavations between them were little better; fortunately the precaution had been taken to leave some parts undug altogether, which prevented a rush of water, and the only damage done, was the accumulation of silt and boulders which had to be taken out a third time.

In the third working season, the arching was completed to a distance of 85 chains from the head of the canal, and all possible precautions were taken to prevent injury being caused by the surface drainage. On the whole we succeeded. The space above the canal had not been sufficiently filled in before the rains came on, and at the lower end five chains were damaged. The lines of drainage from the landslips and other parts have been attended to, the filling in has been completed, and I hope there is now no danger from the Sarda river or hill drainage. The packing has been consolidated by the floods rising over the top of the canal. Silt from the hills has smoothed the face of the country, and I anticipate no more damage within the first mile, which was the dangerous part, though it may be necessary to make some further arrangement for passing over the surface drainage. Last year the injured parts of the lower end were repaired, and the masonry open canal was completed. The length of the arched portion is 85 chains, or about a mile-and-a-half, and there the water runs at a depth below the surface of the country ranging from 15 to 26 feet. There are lanterns at every 10 chains to admit of light and air. The open canal is about four miles in length with many arches, by which the storm water is taken over, and it crosses under the beds of two streams, which during the rains carry heavy floods from the hills to the Sarda, in masonry tubes; when it gets into the stiff clay soil, the water is carried on by a single excavation till it reaches the surface, when the line is turned westward as high up as the levels permit towards the Chini nadi. Any number of small cuts can be taken off this line, or at the end of the main channel, and carried southward. By and by a good many villages may be irrigated by raising the water at different parts, but it will be time enough to attend to this when the main channel is in working order.

Deducting 60,784 rupees on account of excavation, leaves 1,39,216 rupees as the cost of 8,10,800 cubic feet of masonry, which is equal in round numbers to 17 per hundred cubic feet, and if it be taken into consideration that this includes 2,11,037 cubic feet of arching, I think it will be admitted that this heavy work has been executed cheaply. I estimated the cost of this canal at 2,00,000 rupees, but have since then been obliged to arch over 85 chains, which added very much to the cost.

One mill has been built near the Barmdeo Mandi. Others will be constructed when cultivators have settled, and I hope to have the canal in working order in time for this season's rabi crops.

His Honour may think the cost of excavation is high, but it must be taken into consideration that pudding stone, or conglomerate, is the most difficult of all rocks to get rid of. Huge boulders, each weighing many tons, were found in the deep digging for a mile-and-a-half; and in the first mile, there was nothing but boulders and sand. It must also be remembered that the depth of excavation, as much as 26 feet, and generally 20 in the first 85 chains, added much to the cost, while the causes mentioned in para. 10 rendered it necessary to clear out the first mile twice after the first excavation had been made.

Dr. BURMDEO CANAL ACCOUNT, showing Total Expenditure from 1872 to May 1875. *Cr.*

Date.	Particulars of Account.	Amount.	Date.	Particulars of Account.	Amount.
		Rs. a. p.			*Rs. p.*
1872 to 1875-76	Takávi advances made in four sums of—		1872 to May 1875	Excavation, 12,146,842 cubic feet, at 8 rupees per 100	60,784 –
	Rs. a. p.			Stone rubble, 810,832 cubic feet, at 3 rupees per 100	24,325 – –
	1872-73 - 50,000 – –			Arch stone, 211,037 cubic feet, at 8 rupees per 100	16,883 – –
	1873-74 - - 50,000 – –			Lime, 100,136 maunds, at 25 rupees -	25,033 – –
	1874-75 - - 50,000 – –			Surkhi, 63,272 maunds, at 15 rupees -	9,492 – –
	1875-76 - - 50,00 0 – –			Bajri, 185,987 maunds, at *Rs.* 1. 8 *a.* -	2,789 8 –
				Labour, 1,097,633 cubic feet of masonry, at an average of 5 rupees per 100 cubic feet -	54,882 – –
				Sundries, incidental expenses, such as timber for centring, iron, tools, nails, baskets, &c., &c. -	5,811 8 –
	TOTAL - - - *Rs.*	2,00,000 – –		TOTAL - - - *Rs.*	2,00,000 – –

(No. C. 620, W.)

From the Secretary to Government North West Provinces, Public Works Department, Irrigation Branch, to the Secretary to the Government of India, Public Works Department; dated Naini Tal, 13th July 1877.

* * * * * * *

I am further to forward copy of a letter No. 561, dated 21st June last, from the Commissioner of Kumaon, intimating the repayment of a further instalment of 50,000 rupees on account of the Barmdeo Canal loan. A reference to this office, No. C. 682 W., of 18th October 1876, will show that one lakh out of the 2,00,000 rupees advanced under the authority of Government of India's No. 78 I., dated 4th March 1871, has now been repaid.

Enclosure in the above Letter.

Subject:—Loan of Two Lakhs Rupees received from Government for constructing Irrigation Works at Barmdeo.

Intimates having paid into the Almora Treasury 50,000 rupees as a second instalment on the above account, making a total of one lakh. Commissioner hopes to pay similar instalments next and following years, and interest afterwards.

Appendix, No. 12.

PAPER handed in by the *Chairman*.

Appendix, No. 12.

LETTER from Colonel *Fife* to the Chairman of the Committee.

My Lord, Wark-on-Tyne, Hexham, 25 June 1878.

THERE are several points in my evidence on which some additional information may be useful, and I now do myself the honour of supplying it.

First, with respect to fallows. The practice in the Dekkan, where the area of irrigation is small compared to the area of country and to the population, is to give the irrigated land very little rest, but to manure it well. Where there is a triennial rotation, rice, sugar cane, and wheat, or other comparatively light crop, manure is put on before the rice (possibly before the sugar cane also); water is then added, and the soil is worked into a condition of pap by ploughing and driving cattle through and through. The rice is afterwards sown. The process is laborious and expensive, but the very best kind of rice is thus produced. In Sind, on the other hand, the greater part of the rice is grown without manure, and without fallowing the land, but with very copious watering. In fact, in the delta the water is sometimes so deep on the land that boats have to be used for reaping the crops. This excessive watering appears to do no harm, provided it is not done suddenly. The plants grow as the water rises, and keep their heads above its surface. The practice is rather one of necessity than choice, because the water being uncontrolled in the inundation canals, excess of supply entering a canal must find its way on to the lowest ground, which thus becomes flooded to a depth of as much as five feet sometimes. A large portion of the land is covered with weeds, and unfit for cultivation. The best rice, comparatively a small area, is however grown in Upper Sind, where some fallowing, and, if I am not mistaken, manuring, also are practised. The water is applied freely, but the land is not flooded as it is in the delta. There are, at least, two distinct kinds of rice grown in Sind, and the cultivation varies from the most careless to the very best, according to circumstances. I have known the people sow the seed broadcast without fallowing or manuring, or even ploughing up the previous year's stubble. The result was, at length, more weeds than rice, the out-turn per acre a mere fraction of what it should have been, the land injured, and the water shamefully wasted. It may be said that three-fourths of the latter was wasted, or worse than wasted, in growing weeds, and one-fourth only utilised for the rice. This occurred on the Eastern Narra Canal, under a bad revenue arrangement, which took no count of the area irrigated. This has been now corrected, but some time must elapse before the land can recover its fertility.

For other crops, like "Jowari," the practice in the Dekkan is to fallow occasionally all land for which there is not manure. In Sind, the land is fallowed from one to three years after a good crop, which is usually eight to 10 feet in height, and so thick that it is difficult to get through it. I have measured jowari stalks up to 15 feet in height; but these are only occasional.

After producing such a crop as I have described in Sind, the land is of course weak, and it is a great advantage that in a rainless country the fallowing can be most complete. On the properly irrigated fields there are no weeds. The decayed stubble is alone seen on the fallows. In a memorandum which I was requested to put in with my Evidence, *vide* Question No. 2126, the fallacy of expecting improvement in the Sind revenue under a system which induces the people to neglect the long-established custom of fallowing is alluded to. With a large area of land, and a very limited, I may say small, population, it might be questioned whether the system was a good one, even if the water cost nothing. The best condition for both the people and the State is that under which the people's labour and capital produces the largest result, and this surely will not be arrived at if weakened soil is cultivated when there is plenty of good land available. But when it is considered that the mere maintenance of the lands, exclusive of the interest on the capital sunk, costs the State 70,000 *l.* per annum, and the people possibly as much more for branch canals and minor distributing channels, to produce a revenue of 340,000 *l.*, the matter assumes an aspect which can only lead to one conclusion, viz., that to produce a result favourable to the people and the State, we must husband our labour and adopt a system which will encourage fallowing, and make the water produce the best result. That system we had before the settlements commenced, which have been gradually introduced during the past 15 years. The people were required to pay only on the area they actually irrigated each year. The Government of Bombay, after considering the question, arrived at this conclusion; but I am not sure that the arrangement of payment for area irrigated only has been effectually carried out. I am afraid that one of the conditions introduced at the request of the Commissioner in Sind, viz., that the people should not be assessed on this plan if they would agree not to throw up their holdings within 10 years, may have had the effect of virtually defeating the object contemplated. The Commissioner's modification can only, supposing it practicable to carry it fully out, make the exhausting of the soil less tempting to the people for the first few years of a lease. It does not prevent them from exhausting the soil in the later years,

and

and depriving the cultivation lower down the canal of its fair share of water, and if the people choose to exhaust the soil at once, at the commencement, and, having spent all their gains (as they always do), plead poverty, and say they cannot hold their leases any longer, and ask for land elsewhere, or move to some other part of the country, which they can easily do, and covertly obtain it, the Administration will be placed in an awkward predicament.

Nothing is so well calculated for the benefit of the people, who are extremely improvident, and for the State, which has to incur a heavy outlay for the irrigation, as that under which the area irrigated each year only is assessed. The area of irrigation, easily ascertained by counting the irrigated fields, whose areas are all known and recorded on maps, &c., is a measure at once both of the people's ability to pay revenue and of the expenditure of the water. When there is an unfavourable inundation, and the area of irrigation is consequently less than usual, the people have not to pay for a large area, and the close scrutiny by the local officers of the area actually irrigated each season affords reliable information as to the working of a canal, and the real demand for water.

Misconception as to the condition of the canals generally to supply the needful wants of the province is apt to arise from forgetfulness of the fact that, before we took Sind, the various meers and zemindars, among whom the business and profit of the irrigation was distributed, did not uniformly clear out the canals. An energetic meer or zemindar would clear out, extend, and even construct a canal, and the abundant supply of water and new land would at once draw cultivators to the spot to till the soil; while a less energetic man, or one on whose family some misfortune might have fallen, would neglect his clearances at a time, moreover, when possibly more than usual expenditure had become necessary on account of some alteration in the channel of the everchanging Indus, which injured the canal. It used to be said in Sind 30 years ago, "It is no use making a new canal. The "people merely transfer their labour from some old canal to the new one, and there is no "real increase of revenue." There was truth in that saying, and if we had not facilitated irrigation by improving the water level in the canals we should not have so considerable an increase in the area as has taken place. But the saying, in conjunction with the fact of the whole of the canals not having been uniformly cleared under native rule, points clearly to the conclusion that there are more canals in Sind than the population can manage, supposing them to be all completely cleared. It can, I have no doubt, be said that some canals, or branches in the province, are not completely cleared, but this does not show that the Government has neglected to do all that was really necessary in the way of clearance. It was always the case that some, I may say a great many, of the canals were not completely cleared. They were, in fact, not required. By facilitating irrigation we can, with even a slowly-growing population, largely and rapidly extend the irrigation, and there will be fewer and fewer of disused or partially disused canals, though there will always remain some which are so faulty as to be more expensive to restore than they are worth. This is precisely what has taken place since 1853-54. There has been no neglect of Government clearances, though there are still many canals which are not in complete use. It is known that the people have in places neglected to clear their own canals or branches; I mean canals which were never cleared by the State, either under Native rule or our own. This circumstance has already occupied the attention of both the local officers and the Government; the causes assigned are various, but it is not improbable that the extension of irrigation in other places, and consequent increased demand for labour, has rendered the task more difficult than it used to be. I may remark here that where the people neglect to clear their own canals there is a tendency on the part of the local or district officers to take the canals over, and clear them at the expense of Government. But this is a step in the wrong direction. The only sound policy is to throw the responsibility and expense of clearing the smaller canals as much as possible on the people themselves. When they have to bear the whole expense there is security against injudicious outlay for work, and waste of water, on weakened soil which requires fallowing.

About four years back I pointed out to the Superintendent of the new settlements that in order to secure a fair supply of water at the tails of the canals, we must, if those settlements were to continue, entirely alter the shape of the canals. The abstraction of more water in the upper part than was formerly customary must be met by enlarging the canals at their heads, and throughout a great part of their length. The Superintendent said, why should this not be done. In reply, I explained that to do this we should have to remove the huge spoil banks, the accumulation of ages of clearance, as well as excavate the ground, that it might cost the Government a million sterling, and that when done it would merely enable the people to irrigate exhausted land which they ought to fallow.

All experience goes to show that the more completely the water is under control, and the more economically it is used, the better is the result. The best crops in Sind are, as a rule, those for which the water is raised by wheel, in the case of "Jowari," and those for which there is no deep flooding of the land in the case of rice. The Government might lay out millions in enlarging the inundation canals with no other result than bringing the whole province into the present condition of the delta. The really excellent cultivation which is to be seen in many parts of Upper and Central Sind would give place to inferior rice and general flooding. In Upper and Central Sind, where the fallowing system is practised, there is less harm done by a heavy inundation, because a great deal of the surplus water can be turned on to the fallows; but if the canals are enlarged, and the fallows are discontinued, the surplus water must drown the standing crops. In that

Appendix, No. 12.

extremely flat country, without natural drainage channels, surplus water can only escape on to the land.

I will now refer to Question No. 1964. In replying in the affirmative to that question, I should have added that the establishment was increased at a time when the Government of India contemplated a very vigorous prosecution of irrigation works. One large project after specific sanction was, it is true, suspended, and another large one, which the Government of Bombay was led to expect by the Government of India would be sanctioned, was ultimately thrown over, but the increase was made on general grounds, rather than for works which had been specifically sanctioned with complete plans and estimates.

With reference to my reply to Question No. 2145, when I said that "the local governments would study economy much more closely than they now do," I should have added, "or can do." There has been no disposition to be extravagant; on the contrary, economy has been studied, but the plan of indenting, as it were, on the Government of India for funds, while it is observed that some other local government is apparently recovering liberal sums, necessarily leads to the result of a local government trying to get all it can, especially after refusal to what it conceives to have been a reasonable, if not necessary, demand during a former year. This is not conducive to economy. Under the existing arrangements, moreover, it is really impossible for the local government to study economy as closely as should be done. The Government of India modifies its policy, as it did some years ago. After determining to prosecute irrigation works vigorously, and sending inspectors general of irrigation to visit various parts of the country, to encourage the furtherance of their object, they suddenly came to the conclusion that irrigation works did not pay. At any rate, the supply of money was at once cut down. Nothing had occurred in western India, including Sind, to merit this sudden change of policy. It is true the irrigation on the Dekkan works, which had only commenced, had not been made use of by the people so quickly as we had expected, but there was nothing hopeless in their condition. The Government of Bombay was not prepared for the change. Establishments had been largely increased, surveys made, plans and estimates prepared, and everything was on a scale to carry on irrigation works vigorously.

Then, again, the officers successively employed by the Government of India as inspectors general of irrigation to visit western India did not always hold the same views. What was approved one year by one inspector general was not approved afterwards by another. Moreover, not one of the four inspectors general who have been deputed by the Government of India to visit western India at different times had any previous acquaintance whatever with its irrigation. They were officers of great ability and experience, but still in a strange country they had much to learn before they could teach, and their views, as already mentioned, did not always accord. It was not only impossible for the local government under such circumstances to study economy as closely as it ought to have been, but it required the greatest care to prevent a deadlock and stoppage of works on the one hand, or great waste of money on the other.

In replying to Question No. 1878, I should have added that the area of inundated land varied greatly, but that the average cultivation on it was, I believed, very much the same as it used to be, and that that kind of cultivation was always very popular in Sind, as it required no labour and expense for irrigation, and it occurred at a period from October to April, when the irrigation on the canals generally had ceased for the season. The people have always made good use of the inundated land. Its extent depends as much on local changes in the Indus as this volume of water during the inundation period. Some districts, like that on the left bank above Sakkur, are more liable than others to be submerged. An overflow often takes place unexpectedly, and it afterwards occurs for several years in succession. It will then cease altogether for 10 and even 20 years, and some other spot will be submerged. Heavy rain in the Punjab and the mountainous country beyond will always cause overflow of the Indus in August, when the regular supply from the melting snow is at its maximum. If, at the same time, local changes of the river take place at certain spots favourable for overflow, the quantity of water which spills over the banks is enormous. As much water has been known to spill for a time as is carried forward by the river itself, enormous as that is.

In supplying information about the new works in the Dekkan, I gave their dimensions and the capacity of the storage works. The cost of storing water is, however, a very important matter, and I therefore enclose a statement showing full particulars of nearly all the storage works which have been constructed, proposed, or condemned (from being too costly). This statement is the result of a great many surveys carried out during the past 15 years, and the figures are accurate. The cheapest storage basin of the 27 shown was Ekruk (No. 4 on the list). The expense per million cubic feet of storage was about 23*l.* In the case of the Mutha reservoir (the first on the list), the expense was 50*l.*, and this may be taken as a fair average. It is important, however, to bear in mind that the actual cost of the water supplied each year depends upon the number of times the reservoir is replenished. The Mutha reservoir is very favourably circumstanced. The river of that name which supplies it has its catchment in the western ghâts, and the supply of water is so abundant that the cost is much less than the figures indicate, which only show the original cost and capacity of the reservoir. The supply is sufficient to fill the reservoir 16 times, but this cannot all be utilised because it nearly all comes between May and November. The conditions admit of a very liberal use of the water from May till

till November, without drawing upon the supply necessary for the remainder of the year. In November the reservoir is full. Appendix, No 12.

The last point on which I should wish to make some remarks has reference to the conclusion of my reply, under Question No. 1970. Sir George Campbell has no doubt shown how loan questions should be dealt with in the Legislative Council; but I should mention that, in addition to that particular point, there are others which I think might with advantage have equal discussion and publicity. I think the best arrangement for the future construction of irrigation works and the management of existing ones would be to discontinue the annual assignment of funds by the Government of India, and give the local government instead the present irrigation revenue, or a portion of it, to form a fund. I would leave it to the local government to lay out the fund at its disposal, and any loan it might raise for new works, and to make its own arrangements for establishment, the expense of which would of course have to be met from the fund. The Budget, with complete information of both revenue and expenditure, should be considered in the Legislative Council each year. I think that under such an arrangement we should secure economy and efficiency, and that the real value of irrigation in India would become better known than it can be under the present system.

By good management and imposing water rates, which would more closely approach the real value of water than those now in force, the local government could increase its means for constructing works, and the blessing of irrigation in that dry hot climate would be extended to its full economical and true limit.

I have, &c.
(signed) *J. G. Fife*, Colonel, R.E.

Lord George Hamilton,
Chairman, House of Commons Committee
on Public Works.

MEMORANDUM.

(No. 5320 of 1877.)

Office of Chief Engineer for Irrigation,
Poona, 1 September 1877.

THE accompanying statement of dimensions and costs of storage works constructed, under construction, or proposed, in the Bombay Deccan, prepared by Mr. Walter C. Hughes, C.E., Assistant Chief Engineer for Irrigation, is submitted for the information of Government, with a view to its being printed and circulated for the information of the department.

The statement is a revision of that submitted in 1871 by Colonel Fife, with this exception, that it comprises information in respect of the storage works only and not their canals or distributaries, regarding which a separate statement is proposed to be prepared. It may be noted that this statement gives the actual cost of the completed works, and includes a large number of schemes investigated since the preparation of the former statement. It is also more complete in giving details of dimensions of the works. Government Resolution, No. 47 I.—524 of 1871.

The information will be of extreme value in considering the merits of future proposals here or elsewhere.

C. J. Merriman, Colonel, R.E.,
Chief Engineer for Irrigation.

BOMBAY PRESIDENCY—IRRIGATION DEPARTMENT. - - - -

COMPARATIVE STATEMENT of Dimensions and Cost of STORAGE

No.	COLLECTORATE.	NAME OF WORK.	Drainage Area, Square Miles.	Fall of River above Dam, Feet per Mile.	Length of Dam, Feet.	Maximum Height of Dam in Feet.	Maximum Depth of Full Supply, Feet.	Depth from Full Supply to Level of Cill of Outlet, Feet.	Length of Waste Weir, Feet.	Construction.
1	2	3	4	5	6	7	8	9	10	11
1	Poona - - -	Mutha Reservoir -	196	6·00	3,617	97 84	88·84	31·00	1,425	Masonry -
2	Sholápur - -	Pángaon Tank -	298	9·00	15,100	76·8	60·8	30·00	1,500	Earthen -
3	Bhore-Satara -	Bhatghur Reservoir -	128	5·00	3,129	101·00	93·00	63·00	1,400	Masonry -
4	Sholápur - -	Ekruk Tank - -	160	9·00	7,000	75·66	59·66	39 82	750	Earthen -
5	Satara - - -	Newri - - -	590	19·5	7,505	95·12	81·12	45·00	4,000	Ditto -
6	Ditto - - -	Mhaswad - -	500	12·00	9,080	79·79	66·79	24·00	3,000	Ditto -
7	Khandesh - -	Munnar - - -	330	9·21	9,396	66·78	56·78	40·00	2,014	Ditto -
8	Sholápur - -	Ashti - - -	92	12·00	12,709	57·75	45·75	27·00	800	Ditto -
9	Satara - - -	Nehr - - -	60	24·00	4,820	74·00	60·00	31·00	700	Ditto -
10	Poona - - -	Shirsuphal Tank -	23	20·00	2,188	54·32	42·38	31·00	300	Ditto -
11	Khandesh - -	Mukti - - -	50	19·00	2,770	65·00	52·00	41·00	1,300	Ditto -
12	Ditto - - -	Dhywell - - -	53	29·40	2,018	89·54	75·54	32·00	840	Ditto -
13	Satara - - -	Wawurwihira Tank -	40	36·00	2,270	64·67	53·67	36·00	900	Ditto -
14	Ditto - - -	Sonekeh - - -	22·5	51·4	7,350	76·21	64·21	48·00	500	Ditto -
15	Poona - - -	Matoba - - -	10	32·00	6,095	48·41	39·41	29·00	600	Ditto -
16	Ditto - - -	Bhadalwadi - -	30	23·00	2,725	54·09	44·09	35·00	400	Ditto -
17	Satara - - -	Pingli - - -	20	31·00	5,200	53·50	44·50	29·00	750	Ditto -
18	Ditto - - -	Mayni - - -	54	20·00	2,870	57·33	44·33	31·20	600	Ditto -
19	Khandesh - -	Mhaswa - - -	14	22·00	1,494	44·00	34·00	22·00	300	Ditto -
20	Dharwar - -	Doni - - -	24	33·00	469 452	55·00 51·00	45·00	34·00	350	Ditto - Masonry
21	Admednagar - -	Kapurwadi - -	7·03	30·00	5,000	35·26	27·26	15·00	400	Earthen -
22	Sholápur - -	Pandharpur - -	5·7	24·00	3,500	44·00	37·00	16·00	200	Ditto -
23	Khandesh - -	Mehrun - - -	3·45	29·33	1,848	41·20	32·20	23·00	200	Ditto -
24	Dharwar - -	Medleri - - -	10·	33·50	2,300	41·00	34·00	15·00	700	Ditto -
25	Poona - - -	Pashan - - -	16·	41·00	2,637	46·00	36·00	15·00	400	Ditto -
26	Satara - - -	Islampur - - -	2·45	42·00	2,892	30·97	23·97	15·00	200	Ditto -
27	Poona - - -	Patus - - -	2·97	38·00	2,900	29·00	22·00	16·00	170	Ditto -

Note.—Column 21 shows Cost of whole Storage per million

Poona, 1 September 1877.

BOMBAY PRESIDENCY—IRRIGATION DEPARTMENT.

Works Constructed, under Construction, or Proposed, in the *Deccan*.

COST.					Arrears of Contours in Millions of Square Feet.		Total Capacity in Millions of Cubic Feet.	Available Capacity, Cubic Feet.	Cost of Water Stored per Million Cubic Feet.	No.	REMARKS.
Dam.	Outlet.	Waste Weir.	Land Compensations.	TOTAL.	At Full Supply Level.	At Outlet Level.					
12	13	14	15	16	17	18	19	20	21	22	23
Rs.	*Rs.*	*Rs.*	*Rs.*	*Rs.*					*Rs.*		
21,46,262	36,677	1,18,845	3,14,000	26,15,784	160·356	60·625	5,226·076	3,476·076	500	1	Compelted. Actual cost.
9,85,382	60,000	71,421	1,63,008	12,79,819	291·961	25·625	5,020·041	4,763·791	255	2	In progress.
10,81,545	7,524	53,404	5,02,909	16,45,382	156·116	10·656	4,641·698	4,153·496	354	3	Proposed.
5,38,605	64,406	96,818	61,553	7,66,382	202·080	12·211	3,350·030	3,330·030	227	4	Completed. Actual cost.
11,90,743	25,000	1,81,223	72,000	14,68,966	142·437	15·875	3,095·250	2,952·594	474	5	Proposed.
7,75,292	23,145	60,194	75,522	9,34,153	174·847	48·508	3,072·134	2,632·770	304	6	In progress.
4,98,786	36,982	37,166	40,000	6,12,934	74·748	3·260	1,576·480	1,560:177	388	7	Proposed.
3,58,009	21,151	10,765	63,000	4,52,925	116·610	11·953	1,499·470	1,419·384	302	8	In progress.
2,87,347	9,220	19,137	18,697	3,34,401	29·390	3·400	522·643	489·777	639	9	Ditto.
1,13,219	4,000	3,871	4,000	1,25,090	36·320	6·080	369·621	367·493	338	10	Ditto.
1,96,653	26,368	37,346	385	2,60,752	21·864	–	367·952	367·952	708	11	Completed. Actual cost.
1,99,418	16,120	16,322	6,986	2,38,846	17·337	3·920	351·383	294·485	679	12	Proposed.
1,64,292	11,000	43,884	12,000	2,31,176	20·595	3·520	310·418	290·002	744	13	Ditto.
3,19,269	10,742	18,206	42,506	3,90,723	17·200	0·370	298·279	296·429	1,309	14	Condemned.
1,29,644	6,000	1,635	12,000	1,49,279	20·759	0·360	230·011	228·760	649	15	In progress.
1,06,437	5,250	5,664	3,800	1,21,151	14·600	0·313	223·269	222·328	542	16	Ditto.
1,53,948	8,726	16,159	7,007	1,85,840	15·222	1·125	200·865	195·241	925	17	In progress.
1,53,113	14,868	21,348	2,270	1,91,599	16·570	1·200	195·275	190·475	981	18	Completed. Actual cost.
59,375	6,152	962	3,215	69,704	18·348	0·790	160·962	158·571	433	19	In progress.
48,846	9,640	13,611	700	68,797	8·884	0·764	140·614	136·411	489	20	Rejected for special reasons.
64,093	2,019	13,611	700	80,423					571		Sanctioned.
88,079	4,200	10,500	4,200	1,06,979	12·996	1·616	110·683	103·678	966	21	Condemned.
85,652	4,516	16,837	431	1,07,436	7·458	2·033	91·725	81·561	1,171	22	Town water-supply. Completed. Actual cost.
48,472	3,123	19,628	3,603	74,826	6·575	0·050	68·044	67·894	1,099	23	Town water-supply. In progress.
28,353	6,513	4,319	2,000	41,185	7·360	1·120	62·384	57·600	660	24	In progress.
1,08,109	10,462	8,692	26,627	1,53,890	4·390	1·110	43·752	36·352	3,510	25	Town water-supply. Completed. Actual cost.
30,767	1,427	1,084	7,882	41,160	4·158	0·470	25·236	24·501	1,631	26	In progress.
25,353	1,575	3 230	1,400	31,558	2·134	0·087	15·000	14·800	2,108	27	Town water-supply. In progress.

cubic feet, and is arrived at by dividing Column 16 by 19.

Walter C. Hughes, C.E.,
Assistant Chief Engineer for Irrigation.

C. J. Merriman, Colonel, R.E.,
Chief Engineer for Irrigation.

Appendix, No. 13.

MEMORANDUM handed in by Mr. *Alexander Meadows Rendel*, C.E.

Appendix, No. 13.

LET us assume, as is usual, that the cost of running a passenger train one mile is the same as the cost of running a goods train one mile. This is no doubt disputable, though I consider the difference is not large; but if the same assumption is made for all lines, and passengers are taken into account, as well as goods, the error, whatever it is, is not material to the present argument.

Assume also that the average charge in Great Britain and Ireland for carrying a passenger one mile is $1\frac{1}{16}$ *d.*, and for carrying a ton of goods (including minerals amongst goods) $1\frac{1}{8}$ *d.* per mile.

I am obliged to assume these figures because no English company either publishes its average charges or states its charges in such a way as to allow the averages to be ascertained.

The object here is to assume averages favourable to the English lines—that is to say, rather below than above the fact, and I am quite satisfied that in taking $1\frac{1}{16}$ *d.* for passengers and $1\frac{1}{8}$ *d.* for goods I have done so.

We then have the following figures as regards English lines.

Taking the Board of Trade returns for 1877, the receipts per English passenger and goods train mile were in that year respectively 4 *s.* 9 $\frac{1}{4}$ *d.* and 6 *s.* 3 *d.*

The cost per English train mile, goods or passenger, calculated as I shall calculate Indian costs was 2 *s.* 10 $\frac{1}{2}$ *d.*

From these figures, taken in connection with the assumed average charges, it follows:—

(1.) That the average number of passengers at one time in an English train (treating parcels, &c. as persons by dividing the receipts from those descriptions of traffic by the average passenger rate) was 54, and that the average weight of goods in a goods train was 67 tons.

(2.) That the cost of carrying a passenger one mile was ·64 *d.* and the cost of carrying a ton of goods one mile was ·5 *d.* ($\frac{1}{2}$ *d.*).

Now, in India, in the year 1877, on the same assumption in regard to train mile cost, the cost of carrying a passenger one mile varied from ·086 *d.* on the narrow gauge South Indian line, or about 1-7th the English cost, to ·227 *d.* on the narrow gauge Rajpootana State line, or rather more than one-third the English cost. The average cost on nine Indian lines, covering, in the whole, 6,477 miles, was ·152 *d.*, or less than one-fourth the English average cost. The cost on the East Indian Railway was one-eighth of a penny, or less than one-fifth the English cost.

The cost of carrying a ton of goods one mile in India varied from ·218 *d.* on the East Indian, or about two-fifths the English cost, to ·74 *d.*, or half as much again as the English cost on the Rajpootana. The average cost on the same nine lines was ·376 *d.* (three-eighths of a penny), or 30 per cent. less than the English cost.

Taking passengers and goods together it will be seen from these figures that the cost of transport by rail in India is at present less than half the cost of transport by rail in England.

This result, it must be remembered, is attained, notwithstanding that the cost of fuel (taken at the point of consumption), and of European labour in India is, on the average, fully three times as high as in England.

The main cause of this difference between the working cost of English and Indian railways in favour of the latter is the larger train loads and longer distances passengers and goods are carried in India. Thus the average passenger train loads in India vary between 342 persons on the narrow gauge South Indian line, and 179 on the broad gauge Madras; the average on the nine lines being 245 persons, against the average of 54 persons on English lines.

In goods trains the Indian loads vary from 154 tons on the broad gauge Eastern Bengal to 50 tons on the narrow gauge South Indian, averaging on the nine lines 99 tons, against 67 tons in England.

It is, moreover, to be noticed that the cost of working Indian lines is being steadily reduced, whilst the cost of working English lines appears to be steadily on the increase.

I am of opinion that the cost of carrying a passenger or a ton of goods one mile on the East Indian Railway will before long not exceed one-tenth of a penny and one-sixth of a penny respectively.

On

On lines not so favourably placed in regard to fuel, gradients, and quantity of traffic, the cost of transport, in my opinion, might fairly vary from 10 to 40 per cent. above the cost on the East Indian, but ought never to exceed $\frac{1}{8}$ *d.* per mile for passengers and $\frac{1}{4}$ *d.* per ton per mile for goods, on the basis of a passenger and goods train mile costing the same sum.

The great importance of these figures lies in their bearing upon the rates charged, or which may be charged, for transport.

The rates for passengers now average on the nine lines before taken, taking all classes together and the rupee at 1 *s.* 10 *d.*, ·339 *d.*, or say one-third of a penny per mile, varying between ·235 *d.*, or less than $\frac{1}{4}$ *d.* a mile on the South Indian to rather more than $\frac{3}{8}$ *d.* on the East Indian.

The average goods rates varied last year from rather more than four-fifths of a penny per ton per mile on the East Indian to a penny and two-fifths on the Rajpootana State line, averaging on the nine lines ·932 *d.*

Comparing, therefore, the charges with the cost, present or prospective, of transport, it will be seen that Indian Railways possess, so far as working expenses are concerned, a very large power of reduction of rates, especially on the most important lines. Experience also shows that reduction of rates, especially for passengers and cereals, is accompanied by a large increase in traffic.

In regard to the capacity for traffic, I propose to confine myself to a consideration of the East Indian Railway, because I know it best, because it is the most important line in India, and because in regard to capacity there need be no material difference between one line and another.

The East Indian extends from Calcutta through Allahabad to Delhi, about 1,000 miles, with a line from Allahabad to Jubbulpore on the road to Bombay, in all, with other branches, 1,503 miles of line. Of this, 410 miles are double, the remainder single.

At the end of 1877 its locomotive and rolling-stock comprised 501 engines, 982 carriages of the usual descriptions, and 6,701 traffic wagons, varying in capacity from 6 to 10 tons.

This stock proved more than adequate for the transport of 627,117,403 passengers, and 841,308,637 tons of goods one mile, besides mails and the transport of materials for the use of the line. I say more than adequate, because, in consequence of the famine in Madras, that portion of the East Indian rolling-stock running on other lines was always far greater than those portions of the rolling stocks of other lines running on the East Indian.

During the year, therefore, each locomotive conveyed 1,052,130 passengers, and (that is to say, plus) 1,679,259 tons of goods one mile. Each coaching vehicle conveyed 638,613 persons one mile, besides mails; and each wagon conveyed 125,568 tons of goods one mile, besides fuel and other materials for the use of the line.

In addition to this work on the East Indian, a large additional but unknown quantity of work was done by its wagon stock on other lines.

Lastly, the traffic passing over each of the 1,503 miles of railway averaged 1,143 persons and 1,534 tons of goods daily.

Comparison with English lines will now give us a measure of the capacity of Indian lines.

Taking, again, the Board of Trade Returns for 1877, I find that at the end of that year the lines in Great Britain and Ireland comprised 17,077 miles, of which 7,842 miles were single, and 9,235 miles were double, and this mileage was worked by 12,767 locomotives, 38,460 coaching vehicles, and 363,672 goods vehicles.

At the average rates of charge which I have before taken, namely, $1\frac{1}{16}$ *d.* passenger mile, and $1\frac{1}{8}$ *d.* per ton per mile for goods, the transport effected by this stock was equivalent to 5,993,600,000 passengers, and 7,276,800,000 tons of goods carried one mile.

The average work done by the English rolling and locomotive stocks during the year was therefore as follows: Each locomotive carried 470,000 persons, and 570,000 tons of goods one mile.

Each vehicle of the coaching stock carried, including mails, 155,800 persons one mile, and each wagon carried 20,000 tons of goods one mile.

And the amount of traffic passing over each mile of line daily, on the average of all lines in England (including Scotland and Ireland), was 960 persons, and 1,168 tons of goods.

The average quantity of traffic therefore passing daily over the East Indian was greater, mile for mile, than the average daily quantity passing over the English lines taken altogether by at least 20 per cent. in passengers (1,143 against 960) and by at least 30 per cent. in goods (1,534 tons against 1,168).

Each locomotive on the East Indian, on the average, carried during the year more than twice as many passengers, and more than three times as many tons of goods, 1,052,130 passengers + 1,679,259 tons one mile, against 470,000 passengers + 570,000 tons one mile, as were carried by English locomotives.

Each carriage on the East Indian, on the average, carried during the year (without allowing for mails) more than four times as many passengers as each English carriage (638,613 persons against 155,800) and each wagon on the East Indian carried more than six times as much as each English wagon (125,568 tons against 20,000).

Again, in England, each of the 17,077 miles of railway was traversed on the average in 1877 by traffic trains in each direction 17·6 times daily, whilst each mile of the East Indian was only traversed eight times on the average daily.

But if 17·6 trains can be run daily each way on English lines, nearly half of which have only a single line, the same number can be run on the East Indian, at all events, with a slight increase to the portions doubled, that is to say, a traffic already much greater than

Appendix, No. 13.

the average of English lines may be at least doubled without further material expenditure on the line itself, beyond a moderate amount in increasing the extent of double line, the station accommodation, and the locomotive and rolling stock.

What may be done on the East Indian may, of course, by adoption of the same measures, be done on any Indian line, and therefore we arrive at this, that the proved capacity of Indian lines for traffic is considerably more than twice as great as that of English lines, and that the proved capacity of Indian rolling stock is in respect to locomotives, at least three times; in respect of carriages, at least four times; and in respect to wagons, at least six thoes as great as in England.

To this we may add that the cost of Indian railways, taken as a whole, has not so far been half that of English railways.

Speaking, therefore, in general terms, I consider that present experience justifies me in saying that while the cost of Indian railways has been less than half the cost of English railways, the traffic capacity of Indian railways under the circumstances of Indian traffic, and the method of conducting traffic adopted in India, is fully three times that of English railways as now managed; that the Indian lines generally may be worked as the East Indian now is, at less than one-third the cost of English railways, and that with average passenger rates less than one-fourth, and an average goods rates little more than half those of English lines, they may be expected to give, as the East Indian, the Great Indian Peninsular, and the Eastern Bengal are already giving, a much higher interest on their capital cost than any main trunk line in England.

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